

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

**FORM S-1  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

**ARROWHEAD RESEARCH CORPORATION**

(Exact name of registrant as specified in its charter)

**Delaware**  
(State of incorporation)

**46-0408024**  
(I.R.S. Employer Identification Number)

**201 South Lake Avenue, Suite 703  
Pasadena, CA 91101  
626-304-3400**

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

**Christopher Anzalone, Chief Executive Officer  
Arrowhead Research Corporation  
201 South Lake Avenue, Suite 703  
Pasadena, CA 91101  
626-304-3400**

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

*Copies to:*

**Ryan Murr, Esq.  
Goodwin Procter LLP  
Three Embarcadero Center, 24<sup>th</sup> Floor  
San Francisco, CA 94111  
(415) 733-6000**

**Approximate date of commencement of proposed sale to the public:** From time to time after this registration statement becomes effective, as determined by the registrant.

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, please check the following box.

If this Form is used to register additional securities for an offering pursuant to Rule 462(b) 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 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 post-effective amendment filed pursuant to Rule 462(d) 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.

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

Large accelerated filer  Accelerated filer   
Non-accelerated filer  (Do not check if a smaller reporting company) Smaller reporting company

**CALCULATION OF REGISTRATION FEE**

Title of each class of securities to be registered	Amount to be registered(1)	Proposed maximum offering price per share(2)	Proposed maximum aggregate offering price(2)	Amount of registration fee(2)
Common Stock, par value \$0.001 per share	19,363,502	\$0.52	\$10,069,021	\$717.92

(1) Represents shares of Common Stock, par value \$0.001 per share, to be sold by the selling stockholders named in this registration statement and includes an aggregate of 14,280,072 shares of Common Stock that may be issued upon the exercise of warrants held by the selling stockholders and other warrant holders described in this registration statement. Pursuant to Rule 416 of the Securities Act of 1933, as amended, this registration statement also covers such an indeterminate amount of shares of Common Stock as may become issuable to prevent dilution resulting from stock splits, stock dividends and similar events.

(2) Pursuant to Rule 457(c), calculated on the basis of the average of the high and low prices per share of the registrant's Common Stock reported on the NASDAQ Capital Market on December 21, 2009.

**The registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.**

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[Table of Contents](#)

**The information in this prospectus is not complete and may be changed. The security holders identified in this prospectus may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.**

**PROSPECTUS (Subject to Completion)**  
**dated December 28, 2009**

**ARROWHEAD RESEARCH CORPORATION**

**19,363,502 shares of Common Stock**

This prospectus covers the sale of an aggregate of 19,363,502 shares of our Common Stock, \$0.001 par value per share (the “**Common Stock**”), by the selling security holders identified in this prospectus (collectively with any holder’s transferee, pledgee, donee or successor, the “**Selling Stockholders**”). The Common Stock covered by this prospectus consists of (i) 5,083,430 shares of Common Stock issued in a private placement that closed on December 11, 2009, (ii) 5,083,430 shares of common stock issuable upon exercise of warrants (the “**December Warrants**”) issued in the same private placement that closed on December 11, 2009 (the “**December Private Placement**”), and (iii) 9,196,642 shares issuable upon the exercise of warrants (the “**August Warrants**,” and together with the December Warrants, the “**Warrants**”) issued in a private placement with a final closing in August 2009 (the “**August Private Placement**”). The shares identified in clauses (i), (ii) and (iii) are referred to collectively as the “**Shares**.”

The Company will not receive any proceeds from the sale by the Selling Stockholders of the Shares. However, the Company may indirectly receive proceeds to the extent that any Selling Stockholders exercise Warrants to purchase our Common Stock and then resell those Shares under this prospectus. We are paying the cost of registering the Shares covered by this prospectus as well as various related expenses. The Selling Stockholders are responsible for all selling commissions, transfer taxes and other costs related to the offer and sale of their Shares. If required, the number of Shares to be sold, the public offering price of those Shares, the names of any broker-dealers and any applicable commission or discount will be included in a supplement to this prospectus, called a prospectus supplement.

The Company’s Common Stock is traded on the NASDAQ Capital Market under the symbol “ARWR”. On December 24, 2009, the closing sale price of our Common Stock on the NASDAQ Capital Market was \$0.53 per share. Our principal executive offices are located at 201 South Lake Avenue, Suite 703, Pasadena, California 91101, and our telephone number is (626) 304-3400.

**Investing in our securities involves risks. You should carefully consider the [risk factors](#) beginning on page 1 of this prospectus before you make an investment in our securities.**

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.**

The date of this prospectus is \_\_\_\_\_

TABLE OF CONTENTS

	<u>Page</u>
<a href="#">Note Regarding Forward Looking Statements</a>	(i)
<a href="#">Prospectus Summary</a>	1
<a href="#">Risk Factors</a>	1
<a href="#">Use of Proceeds</a>	2
<a href="#">Selling Security Holders</a>	2
<a href="#">Plan of Distribution</a>	6
<a href="#">Description of Securities to be Registered</a>	7
<a href="#">Legal Matters</a>	8
<a href="#">Experts</a>	9
<a href="#">Information with Respect to the Registrant</a>	9
<a href="#">Material Changes</a>	9
<a href="#">Where You Can Find Additional Information</a>	9
<a href="#">Information Incorporated by Reference</a>	9

You should read this prospectus, any applicable prospectus supplement and the information incorporated by reference in this prospectus before making an investment in the securities of Arrowhead Research Corporation. See “Where You Can Find Additional Information” for more information, page 9. You should rely only on the information contained in or incorporated by reference in this prospectus or a prospectus supplement. The Company has not authorized anyone to provide you with different information. This document may be used only in jurisdictions where offers and sales of these securities are permitted. You should assume that information contained in this prospectus, or in any document incorporated by reference, is accurate only as of any date on the front cover of the applicable document. Our business, financial condition, results of operations and prospects may have changed since that date.

**NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This prospectus and the documents incorporated by reference into it contain forward-looking statements that involve risks and uncertainties. The statements contained or incorporated by reference in this prospectus that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “**Securities Act**”) and Section 21E of the Securities Exchange Act of 1934, as amended (the “**Exchange Act**”). The Company has made these statements in reliance on the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements relate to future events or our future performance and include, but are not limited to; statements concerning our business strategy, future research and development projects, potential commercial revenues, capital requirements, new potential product introductions, expansion plans and the Company’s funding requirements. Other statements contained in our filings that are not historical facts are also forward-looking statements. The Company has tried, wherever possible, to identify forward-looking statements by terminology such as “may,” “will,” “could,” “should,” “expects,” “anticipates,” “intends,” “plans,” “believes,” “seeks,” “estimates” and other comparable terminology.

Forward-looking statements are not guarantees of future performance and are subject to various risks, uncertainties and assumptions that are difficult to predict. Actual results may differ materially from those anticipated in these forward-looking statements as a result of a number of factors, including the risk factors described below in this prospectus and in our periodic filings with the SEC, incorporated by reference or included in this prospectus. All forward-looking statements contained in this prospectus are made only as of the date on the prospectus cover. We expressly disclaim any intent to update or alter our forward-looking statements, whether as a result of new information, future events or otherwise. Before deciding to buy or sell our securities, you should be aware that the occurrence of the events described in these risk factors could harm our business, operating results and financial condition, which consequences could materially diminish the trading price of our securities and/or their value.

## PROSPECTUS SUMMARY

Unless otherwise noted, (1) the term “Arrowhead Research” refers to Arrowhead Research Corporation, a Delaware corporation, formerly known as InterActive Group, Inc., (2) the terms “Arrowhead,” the “Company,” “we,” “us,” and “our,” refer to the ongoing business operations of Arrowhead and its subsidiaries, whether conducted through Arrowhead Research or a subsidiary of the company, and (3) the term “Common Stock” refers to shares of Arrowhead Research’s Common Stock and the term “stockholder(s)” refers to the holders of Common Stock or securities exercisable for Common Stock.

### Our Business

Arrowhead is a development stage nanotechnology holding company that seeks to create stockholder value through the creation and operation of nanotechnology companies. Arrowhead currently owns two majority-owned operating subsidiaries, Unidym, Inc. (“**Unidym**”) and Calando Pharmaceuticals, Inc. (“**Calando**”), three wholly-owned non-operating subsidiaries, and has minority investments in two early-stage nanotechnology companies, Nanotope, Inc. and Leonardo Biosystems, Inc. (“**LBS**”). Arrowhead’s mission is to build value through the identification, development and commercialization of nanotechnology-related products and applications. Arrowhead is active in the operation of its subsidiaries, providing key management to the subsidiaries. The Company is currently focused primarily on its two lead subsidiaries, Unidym, a leader in the use of carbon nanotubes for electronic applications and Calando, a clinical stage siRNA delivery company. Arrowhead’s business plan includes adding to its portfolio through selective acquisition and formation of new companies, as capital resources allow.

Our common stock is quoted on the NASDAQ Capital Market under the symbol “ARWR”.

### The Offering

This prospectus relates to the resale by the Selling Stockholders identified in this prospectus of up to 19,363,502 shares of Common Stock, of which 5,083,430 shares are issued and outstanding as of the date of this prospectus, and 14,280,072 are issuable upon the exercise of Warrants. All of the Shares, when sold, will be sold by the Selling Stockholders. The Selling Stockholder may sell their Shares from time to time at market prices prevailing at the time of sale, at prices related to the prevailing market price, or at negotiated prices. We will not receive any proceeds from the sale of Shares by the Selling Stockholders, other than as a result of the exercise of Warrants held by the Selling Stockholders for cash.

### Corporate Information

Our executive offices are located at 201 South Lake Avenue, Suite 703 and our telephone number is 626-304-3400. Additional information regarding our company, including our audited financial statements and descriptions of our business, is contained in the documents incorporated by reference in this prospectus. See “Where You Can Find Additional Information” on page 9 and “Information Incorporated by Reference” on page 9.

### RISK FACTORS

Investors should carefully consider the risks and uncertainties and all other information contained or incorporated by reference in this prospectus, including the risks and uncertainties discussed under “Risk Factors” in our Annual Report on Form 10-K for the year ended September 30, 2009. All of these “Risk Factors” are incorporated by reference herein in their entirety. These risks and uncertainties are not the only ones facing us. Additional risks of which we are not presently aware or that we currently believe are immaterial may also harm our business and results of operations. The trading price of our common stock could decline due to the occurrence of any of these risks, and investors could lose all or part of their investment. In assessing these risks, investors should also refer to the other information contained or incorporated by reference in our other filings with the Securities and Exchange Commission.

## USE OF PROCEEDS

The proceeds from the resale of the Shares under this prospectus are solely for the account of the Selling Stockholders. We may indirectly receive proceeds of up to \$7,185,787 to the extent that any Selling Stockholders exercise warrants to purchase Shares and then resell those Shares under this prospectus, however, we will not directly receive any proceeds from the sale of Shares under this prospectus.

## SELLING SECURITY HOLDERS

The Company has included in this prospectus the following shares of Common Stock:

- 9,196,642 shares issuable upon the exercise of August Warrants issued in the August Private Placement;
- 5,083,430 shares of Common Stock issued in the December Private Placement; and
- 5,083,430 shares of Common Stock issuable upon the exercise of December Warrants issued in the December Private Placement.

In July and August 2009, we sold to certain institutional and accredited investors an aggregate of 9,196,642 units, with each unit consisting of one Share of Common Stock at a per unit purchase price of \$0.30, and a warrant to purchase an additional Share of Common Stock, exercisable at \$0.50 per share, in the August Private Placement.

In December 2009, we sold to certain accredited investors an aggregate of 5,083,430 units, with each unit consisting of one Share of Common Stock at a per unit purchase price of \$0.634, and a warrant to purchase an additional Share of Common Stock, exercisable at \$0.509 per share, in the December Private Placement.

The August Warrants may be exercised beginning in January 2010 and expire in June 2014. The December Warrants may be exercised beginning on June 12, 2010 and expire on December 11, 2010. The number of shares of Common Stock issuable upon the exercise of each Warrant and the exercise price thereof are subject to adjustment from time to time in the event of stock subdivisions, stock splits and stock combinations. With respect to the August Warrants, beginning on July 17, 2010, the August Warrants can be redeemed at the option of the Company at a price of \$1.00 per August Warrant at any time that (i) a registration statement with respect to the underlying Common Stock is in effect (or it no longer required to be in effect under the registration rights agreement) and (ii) the closing price of the Common Stock is at least \$1.20 for at least 30 trading days out of 60 consecutive days prior to the Company's notice of redemption. With respect to the December Warrants, beginning on December 13, 2010 and provided at least one year and a day have elapsed since the closing of the December Private Placement, the December Warrants can be redeemed at the option of the Company at a price of \$1.00 per December Warrant at any time the closing price of the Common Stock is at least \$1.20 for at least 30 trading days out of 60 consecutive days prior to the Company's notice of redemption.

In connection with the August Private Placement and December Private Placement, we entered into registration rights agreements, pursuant to which we have agreed to register the resale of the Shares and the Common Stock underlying the Warrants. The shares issued in the August Private Placement have been registered pursuant to a previously filed registration statement. This prospectus covers the resale of the Common Stock underlying the Warrants issued in the August Private Placement.

## [Table of Contents](#)

The following table sets forth certain information regarding the Selling Stockholders and the shares of Common Stock beneficially owned by them, which information is available to us as of December 15, 2009. Selling Stockholders may offer Shares under this prospectus from time to time and may elect to sell none, some or all of the Shares set forth next to their name. As a result, we cannot estimate the number of shares of Common Stock that a Selling Stockholder will beneficially own after termination of sales under this prospectus. However, for the purposes of the table below, we have assumed that, after completion of the offering, none of the Shares covered by this prospectus will be held by the Selling Stockholders. In addition, a Selling Stockholder may have sold, transferred or otherwise disposed of all or a portion of that holder's shares of Common Stock since the date on which they provided information for this table. We have not made independent inquiries about this. We are relying on written commitments from the Selling Stockholders to notify us of any changes in their beneficial ownership after the date they originally provided this information. See "Plan of Distribution" beginning on page 6.

<u>Selling Stockholder (1)</u>	<u># of Shares held before Offering</u>		<u>Total # of Shares covered by this Prospectus</u>	<u># of Shares Offered</u>	<u># of Shares Underlying Warrants</u>	<u># of Shares beneficially owned after Offering(2)</u>	<u>% of Shares beneficially owned after Offering</u>
Christopher Anzalone	918,791	(3)	315,458	157,729	157,729	603,333	*
Milton Aronowitz, Jr.	270,206	(4)	55,206	27,603	27,603	215,000	*
F. Berdon & Co., L.P.	166,666	(5)	83,333	—	83,333	83,333	*
Steve Boyd	1,460,765	(6)	607,570	303,785	303,785	853,195	1.35%
Brett Bullock	93,864	(7)	78,864	39,432	39,432	15,000	*
Timothy Bullock	186,296	(8)	118,296	59,148	59,148	68,000	*
Nigel Burney	888,000	(9)	788,000	394,000	394,000	100,000	*
Lauren Carajohn	1,100,000	(10)	800,000	300,000	500,000	300,000	*
Cranshire Capital, L.P. (11)	356,137	(12)	333,333	—	333,333	22,804	*
M. Robert Ching	10,281,763	(13)	4,714,442	552,051	4,162,391	5,567,321	8.25%
Brian T. Ching	1,563,381	(14)	852,652	197,161	655,491	710,729	1.13%
Bradley Ching	1,538,848	(15)	852,652	197,161	655,491	686,196	1.09%
Judith Damashek	701,472	(16)	434,805	134,069	300,736	266,667	*
Robert Drust	500,000	(17)	250,000	—	250,000	250,000	*
Fortis Busines Holdings LLC	1,577,286	(18)	1,577,286	788,643	788,643	—	—
Fuller Family Trust	360,458	(19)	315,458	157,729	157,729	45,000	*
Nick Giannopoulos	586,666	(20)	293,333	—	293,333	293,333	*
Angela Giannopoulos	389,590	(21)	389,590	194,795	194,795	—	—
Gemini Master Fund, Ltd. (22)	833,333	(23)	833,333	—	833,333	—	—
Larry Hopfenspirger	556,466	(24)	183,333	—	183,333	373,133	*
Jason & Argo Partners Holding SA	900,000	(25)	300,000	—	300,000	600,000	*
Jason & Argo Partners BVBA	400,000	(26)	400,000	200,000	200,000	—	—
Stephen & Margaret Johnson	270,000	(27)	100,000	—	100,000	170,000	*
David Lackey	499,743	(28)	210,410	55,205	155,205	289,333	*
Kevin McGrath	266,666	(29)	133,333	—	133,333	133,333	*

## Table of Contents

Roy Newman	166,666 (30)	83,333	—	83,333	83,333	*
The Pacific Coast Investment Trust	964,247 (31)	964,247	315,457	648,790	—	—
Arthur Rabin	1,230,914 (32)	930,914	315,457	615,457	300,000	*
Selma Rabin	13,334 (33)	6,667	—	6,667	6,667	*
Jeffrey D. Rahm	514,796 (34)	297,796	59,148	238,648	217,000	*
Donald Richey	116,544 (35)	31,544	15,772	15,772	85,000	*
David Riviere	79,936 (36)	59,936	29,968	29,968	20,000	*
William Haile Riviere, Jr. & Renee Helen Riviere	389,064 (37)	232,564	56,782	175,782	156,500	*
Rockmore Investment Master Fund Ltd. (38)	166,667 (39)	166,667	—	166,667	—	—
Greg Simon	241,646 (40)	118,296	59,148	59,148	123,350	*
Russell Soloman	175,620 (41)	87,810	—	87,810	87,810	*
Ernest W. Southworth, Jr.	333,334 (42)	166,667	—	166,667	166,667	*
Robert B. Stewart, Jr.	337,458 (43)	315,458	157,729	157,729	22,000	*
Thomas C. Stewart	501,748 (44)	315,458	157,729	157,729	186,290	*
Donald Stone	333,334 (45)	166,667	—	166,667	166,667	*
Richard Taylor	340,458 (46)	315,458	157,729	157,729	25,000	*
John Williams	166,666 (47)	83,333	—	83,333	83,333	*
Total	32,738,829	19,363,502	5,083,430	14,280,072	13,375,327	20.65%

\* Less than 1%.

- (1) If required, information about other selling security holders, except for any future transferees, pledgees, donees or successors of Selling Stockholders named in the table above, will be set forth in a prospectus supplement or amendment to the registration statement of which this prospectus is a part. Additionally, post-effective amendments to the registration statement will be filed to disclose any material changes to the plan of distribution from the description contained in the final prospectus.
- (2) This number (i) excludes warrants issued in the December Private Placement which are not exercisable for six months and one day after their issuance and are therefore not included in the calculation of beneficial ownership, and (ii) assumes the sale of all Shares being offered by this prospectus.
- (3) Includes 321,729 shares issuable upon the exercise of a common stock purchase warrant.
- (4) Includes 27,603 shares issuable upon the exercise of a common stock purchase warrant.
- (5) Includes 83,333 shares issuable upon the exercise of a common stock purchase warrant.
- (6) Includes 579,653 shares issuable upon the exercise of common stock purchase warrants.
- (7) Includes 39,432 shares issuable upon the exercise of a common stock purchase warrant.
- (8) Includes 59,148 shares issuable upon the exercise of a common stock purchase warrant.
- (9) Includes 394,000 shares issuable upon the exercise of a common stock purchase warrant.
- (10) Includes 600,000 shares issuable upon the exercise of common stock purchase warrants.
- (11) Downsview Capital, Inc. is the general partner of Cranshire Capital, L.P. (“Cranshire”) and consequently has voting control and investment discretion over securities held by Cranshire. Mitchell P. Kopin (“Mr. Kopin”), President of Downsview, has voting control over Downsview. As a result of the foregoing, each of Mr. Kopin and Downsview may be deemed to have beneficial ownership (as determined under Section 13(d) of the Securities Exchange Act of 1934, as amended) of the shares of Common Stock beneficially owned by Cranshire.
- (12) Includes 333,333 shares issuable upon the exercise of a common stock purchase warrant.
- (13) Includes 4,355,108 shares and 3,905,352 shares issuable upon the exercise of a common stock purchase warrant held by The Ching Revocable Trust, 845,174 shares and 537,729 shares issuable upon the exercise of common stock purchase agreements held by the M. Robert Ching 401K Plan, and 456,000 shares and 182,400 shares issuable upon the exercise of common stock purchase warrants held by BBB Assets of which M. Robert Ching holds investment and voting control. Certain of the warrants held by The Ching Revocable Trust are subject to a warrant blocker agreement whereby the right to exercise such warrant is limited such that M. Robert Ching will not have greater than 9.99% beneficial ownership of the Company.
- (14) Includes 661,691 shares issuable upon the exercise of common stock purchase warrants.
- (15) Includes 658,691 shares issuable upon the exercise of common stock purchase warrants.
- (16) Includes 400,736 shares issuable upon the exercise of common stock purchase warrants.
- (17) Includes 500,000 shares issuable upon the exercise of common stock purchase warrants.
- (18) Includes 788,643 shares issuable upon the exercise of a common stock purchase warrant.
- (19) Includes 157,729 shares issuable upon the exercise of a common stock purchase warrant.
- (20) Includes 293,333 shares issuable upon the exercise of a common stock purchase warrant.
- (21) Includes 194,795 shares issuable upon the exercise of a common stock purchase warrant.

## Table of Contents

- (22) The Investment Manager of Gemini Master Fund, Ltd. Is Gemini Strategies, LLC. The Managing Member of Gemini Strategies is Mr. Steven W. Winters. As such, Mr. Winters may be deemed beneficial owner of the shares, however Mr. Winters disclaims beneficial ownership of such shares.
- (23) Includes 833,333 shares issuable upon the exercise of a common stock purchase warrant.
- (24) Includes 252,778 shares issuable upon the exercise of common stock purchase warrants.
- (25) Includes 800,000 shares issuable upon the exercise of common stock purchase warrants.
- (26) Includes 200,000 shares issuable upon the exercise of a common stock purchase warrant.
- (27) Includes 100,000 shares issuable upon the exercise of a common stock purchase warrant.
- (28) Includes 263,205 shares issuable upon the exercise of a common stock purchase warrant and 20,833 issuable upon the exercise of an option to purchase Common Stock.
- (29) Includes 133,333 shares issuable upon the exercise of a common stock purchase warrant.
- (30) Includes 83,333 shares issuable upon the exercise of a common stock purchase warrant.
- (31) Includes 648,790 shares issuable upon the exercise of common stock purchase warrants.
- (32) Includes 615,457 shares issuable upon the exercise of a common stock purchase warrant.
- (33) Includes 6,667 shares issuable upon the exercise of a common stock purchase warrant.
- (34) Includes 209,148 in the name of Jeffrey Rahm and 67,000 Shares in the name of Stifel Nicolas Custodian for the Jeffrey Rahm IRA issuable upon issuance of common stock purchase warrants.
- (35) Includes 15,772 shares issuable upon the exercise of a common stock purchase warrant.
- (36) Includes 29,968 shares issuable upon the exercise of a common stock purchase warrant.
- (37) Includes 213,282 shares issuable upon the exercise of common stock purchase warrants.
- (38) Rockmore Capital, LLC (“Rockmore Capital”) and Rockmore Partners, LLC (“Rockmore Partners”), each a limited liability company formed under the laws of the State of Delaware, serve as the investment manager and general partner, respectively, to Rockmore Investments (US) LP, a Delaware limited partnership, which invests all of its assets through Rockmore Investment Master Fund Ltd., an exempted company formed under the laws of Bermuda (“Rockmore Master Fund”). By reason of such relationships, Rockmore Capital and Rockmore Partners may be deemed to share dispositive power over the shares of our common stock owned by Rockmore Master Fund. Rockmore Capital and Rockmore Partners disclaim beneficial ownership of such shares of our common stock. Rockmore Partners has delegated authority to Rockmore Capital regarding the portfolio management decisions with respect to the shares of common stock owned by Rockmore Master Fund and, as of August 12, 2009, Mr. Bruce T. Bernstein and Mr. Brian Daly, as officers of Rockmore Capital, are responsible for the portfolio management decisions of the shares of common stock owned by Rockmore Master Fund. By reason of such authority, Messrs. Bernstein and Daly may be deemed to share dispositive power over the shares of our common stock owned by Rockmore Master Fund. Messrs. Bernstein and Daly disclaim beneficial ownership of such shares of our common stock and neither of such persons has any legal right to maintain such authority. No other person has sole or shared voting or dispositive power with respect to the shares of our common stock as those terms are used for purposes under Regulation 13D-G of the Securities Exchange Act of 1934, as amended. No person or “group” (as that term is used in Section 13(d) of the Securities Exchange Act of 1934, as amended, or the SEC’s Regulation 13D-G) controls Rockmore Master Fund.
- (39) Includes 166,667 shares issuable upon the exercise of a common stock purchase warrant.
- (40) Includes 89,148 shares issuable upon the exercise of common stock purchase warrants.
- (41) Includes 89,410 shares issuable upon the exercise of a common stock purchase warrant.
- (42) Includes 166,667 shares issuable upon the exercise of a common stock purchase warrant.
- (43) Includes 157,729 shares issuable upon the exercise of a common stock purchase warrant.
- (44) Includes 157,729 shares issuable upon the exercise of a common stock purchase warrant.
- (45) Includes 166,667 shares issuable upon the exercise of a common stock purchase warrant.
- (46) Includes 157,729 shares issuable upon the exercise of a common stock purchase warrant.
- (47) Includes 83,333 shares issuable upon the exercise of a common stock purchase warrant.

## PLAN OF DISTRIBUTION

The Shares offered by this prospectus may be sold by the Selling Stockholders. Such sales may be made at fixed prices that may be changed, at market prices prevailing at the time of sale, at prices related to such prevailing market prices, or at negotiated prices, and may be made in the over-the-counter market or any exchange on which our Common Stock may then be listed, or otherwise. In addition, the Selling Stockholders may sell some or all of their Shares through:

- a block trade in which a broker-dealer may resell a portion of the block, as principal, in order to facilitate the transaction;
- purchases by a broker-dealer, as principal, and resale by the broker-dealer for its account;
- Ordinary brokerage transactions and transactions in which a broker solicits purchasers;
- in negotiated transactions;
- in a combination of any of the above methods of sale; or
- any other method permitted under applicable law.

The Selling Stockholders may also engage in short sales against the box, puts and calls and other hedging transactions in the Shares or derivatives of the Shares and may sell or deliver the Shares in connection with these trades. For example, the Selling Stockholders may:

- enter into transactions involving short sales of our Common Stock by broker-dealers;
- sell our Common Stock short themselves and redeliver such Shares to close out their short positions;
- enter into option or other types of transactions that require the Selling Stockholder to deliver shares of Common Stock to a broker-dealer, who will then resell or transfer the Common Stock under this prospectus; or
- loan or pledge shares of Common Stock to a broker-dealer, who may sell the loaned shares or, in the event of default, sell the pledged shares.
- There is no assurance that any of the Selling Stockholders will sell any or all of the Shares offered by them.

The Selling Stockholders may negotiate and pay broker-dealers commissions, discounts or concessions for their services. Broker-dealers engaged by the Selling Stockholders may allow other broker-dealers to participate in resales. However, the Selling Stockholders and any broker-dealers involved in the sale or resale of our common stock may qualify as “underwriters” within the meaning of the Section 2(a)(11) of the Securities Act. In addition, the broker-dealers’ commissions, discounts or concessions may qualify as underwriters’ compensation under the Securities Act. If the Selling Stockholders qualify as “underwriters,” they will be subject to the prospectus delivery requirements of the Securities Act.

In addition to selling their shares of Common Stock under this prospectus, the Selling Stockholders may:

- transfer their Common Stock in other ways not involving market makers or established trading markets, including, but not limited to, directly by gift, distribution, privately negotiated transactions in compliance with applicable law or other transfer; or

## [Table of Contents](#)

- sell their Common Stock under Rule 144 of the Securities Act rather than under this prospectus, if the transaction meets the requirements of Rule 144. Each Selling Stockholder will bear all expenses with respect to the offering of Common Stock by such Selling Stockholder.

Each Selling Stockholder will be subject to the applicable provisions of the Exchange Act and the associated rules and regulations under the Exchange Act, including Regulation M, which provisions may limit the timing of purchases and sales of shares of our Common Stock by the Selling Stockholders.

The Selling Stockholders may from time to time pledge or grant a security interest in some or all of the Shares owned by them and, if they default in the performance of their secured obligations, the pledges or secured parties may offer and sell the Shares from time to time under this prospectus after an amendment has been filed under Rule 424(b)(3) or other applicable provision of the Securities Act amending the list of Selling Stockholders to include the pledge, transferee or other successors in interest as “Selling Stockholders” under this prospectus.

The Selling Stockholders also may transfer the Shares in other circumstances, in which case the respective pledgees, donees, transferees or other successors in interest will be the selling beneficial owners for purposes of this prospectus and may sell the Shares from time to time under this prospectus after an amendment has been filed under Rule 424(b)(3) or other applicable provision of the Securities Act amending the list of Selling Stockholders to include the pledge, transferee or other successors in interest as “Selling Stockholders” under this prospectus.

We will make copies of this prospectus available to the Selling Stockholders and have informed them of the need to deliver copies of this prospectus to purchasers at or prior to the time of any sale of the Shares.

We will bear all costs, expenses and fees in connection with the registration of the Shares. The Selling Stockholders will bear all commissions and discounts, if any, attributable to the resale of the Shares. The Selling Stockholders may agree to indemnify any broker-dealer or agent that participates in transactions involving sales of the Shares against certain liabilities, including liabilities arising under the Securities Act.

We have agreed to indemnify the Selling Stockholders against liabilities, including liabilities under the Securities Act, the Exchange Act and state securities laws, relating to the registration of the Shares offered by this prospectus.

### **DESCRIPTION OF SECURITIES TO BE REGISTERED**

Our authorized capital stock consists of 145,000,000 shares of Common Stock, \$0.001 par value per share, and 5,000,000 shares of preferred stock, \$0.001 par value per share.

#### **Common Stock**

Holders of Common Stock are entitled to receive ratably dividends out of funds legally available, if and when declared from time to time by our Board of Directors. The Company has never paid any cash dividends on its Common Stock and the Company’s Board of Directors does not anticipate that it will pay cash dividends in the foreseeable future. The future payment of dividends, if any, on the Company’s Common Stock is within the discretion of the Board of Directors and will depend upon earnings, capital requirements, financial condition and other relevant factors. Holders of Common Stock are entitled to one vote for each share held on each matter to be voted on by stockholders. There is no cumulative voting in the election of directors. In the event of liquidation, dissolution or winding up of the affairs of the Company, holders of Common Stock are to share in all assets remaining after the payment of liabilities and any preferential distributions payable to preferred stockholders, if any. The holders of Common Stock have no preemptive or conversion rights and are not subject to further calls or assessments. There are no redemption or sinking fund provisions applicable to the Common Stock. The rights of the holders of the Common Stock are subject to any rights that may be fixed for holders of preferred stock, if any. All of the outstanding shares of Common Stock are fully paid and non-assessable.

## [Table of Contents](#)

### **Certificate of Incorporation**

Under our Certificate of Incorporation, as amended, our Board of Directors, without further action by our stockholders, currently has the authority to issue up to 5,000,000 shares of preferred stock and to fix the rights (including voting rights), preferences and privileges of these “blank check” preferred shares. Such preferred stock may have rights, including economic rights, senior to our Common Stock. As a result, the issuance of the preferred stock could have a material adverse effect on the price of our Common Stock and could make it more difficult for a third party to acquire a majority of our outstanding Common Stock.

### **Delaware Anti-Takeover Law**

We are subject to Section 203 of the General Corporation Law of the State of Delaware, or DGCL. Section 203 generally prohibits a public Delaware corporation from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the date of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

### **Transfer Agent and Registrar**

We have appointed ComputerShare, Inc. as the Company’s transfer agent and registrar.

### **Listing**

Our Common Stock is quoted on the NASDAQ Capital Market under the symbol “ARWR”.

## **LEGAL MATTERS**

Certain legal matters relating to the validity of the Common Stock offered by this prospectus will be passed upon for us by Goodwin Procter LLP, San Francisco, California.

## EXPERTS

The financial statements of the Company incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K for the year ended September 30, 2009, have been so incorporated in reliance on the report dated December 21, 2009 of Rose, Snyder & Jacobs, a corporation of Certified Public Accountants, given on the authority of said firms as experts in auditing and accounting.

## INFORMATION WITH RESPECT TO THE REGISTRANT

A substantial portion of the information required to be disclosed in the registration statement of which this prospectus is a part is incorporated by reference to our latest report on Form 10-K or definitive proxy statement on Schedule 14A. See "Incorporation of Certain Documents by Reference," "Prospectus Summary," and "Risk Factors." As of December 15, 2009, we had approximately 444 registered holders of our Common Stock.

## MATERIAL CHANGES

There have been no material changes since September 30, 2009 that have not been described in our Annual Report on Form 10-K, this prospectus and our Current Reports on Form 8-K.

## WHERE YOU CAN FIND ADDITIONAL INFORMATION

The Company files annual, quarterly and special reports, proxy statements and other information with the SEC. You may read and copy any document filed by the Company at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the public reference room. The Company's filings with the SEC are also available to the public at the SEC's Internet web site at <http://www.sec.gov>. You may also read and copy this information at the National Association of Securities Dealers, Inc., 1735 K Street, N.W., Washington, D.C. 20006.

The Company has filed a registration statement, of which this prospectus is a part, covering the securities offered hereby. As allowed by Commission rules, this prospectus does not include all of the information contained in the registration statement and the included exhibits, financial statements and schedules. You are referred to the registration statement, the included exhibits, financial statements and schedules for further information. This prospectus is qualified in its entirety by such other information.

## INFORMATION INCORPORATED BY REFERENCE

The SEC allows the Company to "incorporate by reference" the information that is filed by the Company with the SEC, which means that the Company can disclose important information to you by referring you to those documents. The documents incorporated by reference are:

1. The Company's Annual Report on Form 10-K for the fiscal year ended September 30, 2009, filed with the SEC on December 22, 2009; and
2. The Company's Current Reports on Form 8-K, filed with the SEC on October 6, 2009, December 17, 2009, and December 28, 2009.

The Company will provide, without charge, to each person, including any beneficial owner, to whom a copy of this prospectus is delivered, upon such person's written or oral request, a copy of any and all of the information incorporated by reference in this prospectus, other than exhibits to such documents, unless such exhibits are specifically incorporated by reference into the information that this prospectus incorporates. Requests should be directed to the Secretary at Arrowhead Research Corporation, 201 South Lake Avenue, Suite 703, Pasadena, California 91101; telephone: (626) 304-3400.

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**UP TO 19,363,502 SHARES OF COMMON STOCK  
ARROWHEAD RESEARCH CORPORATION**

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**PROSPECTUS**

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\_\_\_\_\_, 20\_\_

**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 13. Other Expenses of Issuance and Distribution.**

The following table sets forth the costs and expenses, payable by the Company in connection with the registration and sale of the Common Stock being registered. All amounts are estimates except the SEC registration fee.

	<u>Amount to be paid</u>
SEC registration fee	\$ 717.92
Printing expense	2,000.00
Legal fees and expenses	25,000.00
Accounting fees and expenses	5,000.00
Transfer Agent Fees	1,000.00
Miscellaneous Fees	2,000.00
Total	<u>\$ 35,717.92</u>

**Item 14. Indemnification of Directors and Officers.**

The Company's Certificate of Incorporation provides for the elimination of personal monetary liability of directors to the fullest extent permissible under Delaware law. Delaware law does not permit the elimination or limitation of director monetary liability for: (i) breaches of the director's duty of loyalty to the corporation or its stockholders; (ii) acts or omissions not in good faith or involving intentional misconduct or knowing violations of law; (iii) the payment of unlawful dividends or unlawful stock repurchases or redemptions or (iv) transactions in which the director received an improper personal benefit.

Section 145 of the Delaware General Corporation Law permits a Delaware corporation to indemnify, on certain terms and conditions, any person who was or is a party or is threatened to be made a party to any threatened pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he is or was a director, officer, employee or agent of the corporation or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by him in connection with such action. The Certificate of Incorporation and Bylaws of the Company require the Company to indemnify the Company's directors and officers to the fullest extent permitted under Delaware law.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Company pursuant to the foregoing provisions, the Company has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable.

**Item 15. Recent Sales of Unregistered Securities**

On April 20, 2007, pursuant to an Agreement and Plan of Merger, dated as of March 21, 2007, by and among Unidym, Unidym Acquisition, LLC ("Merger LLC"), a wholly-owned subsidiary of Unidym, Carbon Nanotechnologies, Inc. ("CNI"), and William A. McMinn as stockholder representative (the "Merger Agreement"), Unidym acquired CNI through a merger of CNI with and into Merger LLC, with Merger LLC continuing as the surviving company of such merger and a wholly-owned subsidiary of Unidym (the "Merger"). Pursuant to the Merger Agreement, at the closing, Unidym issued 5,000,000 shares of Unidym Series A Convertible

## Table of Contents

Preferred Stock, \$0.0001 par value per share (“Unidym Series A Preferred Stock”), to be distributed to the holders of CNI common stock and 2,784,252 shares of Unidym Series B Convertible Preferred Stock, \$0.0001 par value per share (“Unidym Series B Preferred Stock”) to be distributed to the holders of CNI Series E Preferred Stock. In addition, in connection with the Merger, all 2,889,000 shares of Unidym Series A Preferred Stock outstanding prior to the effective time of the Merger were converted into 2,889,000 shares of Unidym Series B Preferred Stock. In accordance with the Merger Agreement, Unidym assumed CNI’s 2007 Restricted Stock Unit Plan and all outstanding CNI restricted stock units that were outstanding as of the effective time of the Merger. In connection with such assumption, appropriate adjustments described in the Merger Agreement were made to the number of shares of Unidym common stock subject to each restricted stock unit. An aggregate of 1,104,010 shares of Unidym common stock are subject to such restricted stock units. Pursuant to the terms of the Merger Agreement, Unidym assumed a warrant that was outstanding as of the effective time of the Merger. In connection with such assumption, the number and type of shares subject to such warrant and the exercise price of such warrant were adjusted such that 64,000 shares of Unidym common stock are issuable upon exercise of the warrant. The share consideration to be paid by Unidym in connection with the conversion of the shares of capital stock of CNI in the Merger was issued in reliance upon an exemption from registration as provided by Section 4(2) of the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder (the “Securities Act”). The share consideration to be paid by Unidym in connection with the assumption of certain restricted stock units and the warrant was issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

In connection with the Merger, on April 20, 2007, Unidym and the Company amended the Agreement to Provide Additional Capital (“Capital Agreement”) dated June 13, 2006 by and between the Company and Unidym to accelerate the payment of \$4 million of additional capital to Unidym, such that it was agreed that all of the capital contributions set forth in the Capital Agreement would be payable to Unidym on April 20, 2007. In aggregate consideration for the acceleration and payment of the additional capital and the transfer from the Company to Unidym of rights and obligations under two sponsored research agreements, Unidym issued 448,000 shares of Unidym common stock to the Company. Such shares of Unidym common stock were issued in reliance upon an exemption from registration as provided by Section 4(2) of the Securities Act.

In addition, on April 20, 2007, the Company entered into a Stock Purchase Agreement (the “Purchase Agreement”) with William A. McMinn, Robert Gower, Mary H. Cain and The Mary H. Cain Marital Trust for the sale of 1,431,222 shares of the Company’s Common Stock in exchange for 1,080,000 shares of Series E Preferred Stock of CNI. The shares of Common Stock issued pursuant to the Purchase Agreement were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

On May 29, 2007, the Company completed the closing of its \$16,469,800 million private placement (the “Private Offering”) of an aggregate of 2,849,446 shares (the “Shares”) of the Company’s Common Stock, at a per share purchase price of \$5.78, and warrants to purchase up to an additional 712,363 shares of Common Stock (the “Warrants”), exercisable at \$7.06 per share. The Shares and Warrants were offered and sold only to institutional and accredited investors and the offering was exempt from registration under the Securities Act in reliance on Section 4(2) of the Securities Act.

On January 23, 2008, the Company issued 50,000 shares of Common Stock valued at \$136,000 as a gift to support the William Marshall Rice University Alliance for Technology and Entrepreneurship. The shares of Common Stock were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

On April 23, 2008, the Company entered into a stock purchase agreement whereby the Company purchased from a Unidym stockholder and director 550,000 shares of Unidym common stock in exchange for \$350,000 in cash and restricted Company common stock valued at \$200,000. As part of the agreement, the director resigned from his seat on the Unidym board and the Chief Executive Officer of the Company was appointed to the Unidym board. The shares of Common Stock issued pursuant to the purchase agreement were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

On April 29, 2008, the Company entered into a stock purchase agreement whereby the Company issued 105,000 shares of Company Common Stock to purchase from a minority stockholder in each Nanotope, Inc. and Leonardo Biosystems, each an early stage nanobiotech company, a 5.78% minority position in Nanotope, Inc. and a 6.13% minority position in Leonardo Biosystems, Inc. The shares of Common Stock issued pursuant to the purchase agreement were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

## Table of Contents

On August 8, 2008, in connection with an acquisition by Unidym of Nanoconduction, Inc., an early stage nanotechnology company, the Company issued 114,115 shares of Common Stock valued at \$250,000 to the owners of Nanoconduction. In exchange for this investment, the Company received 138,889 additional shares of Series C Preferred Stock of Unidym. The shares of Common Stock issued to Unidym were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

On July 30, 2008, the Company issued 15,000 shares of Common Stock valued at \$32,700 to a business and technical consultant engaged to assist in the development of Agonn Systems, Inc., a wholly owned subsidiary of the Company. The shares of Common Stock issued to the consultant were issued in reliance upon an exemption from registration as provided by Rule 506 of Regulation D.

On June 11, 2009 and September 22, 2009, pursuant to the terms of an exchange agreement dated February 25, 2009, the Company issued 2,058,393 shares of Common Stock in exchange for an equal number of Series A Preferred Stock of Unidym. The shares were exchanged with several Unidym Series A Preferred stockholders. The exchange of shares was offered to accredited investors and the offering was exempt from registration under the Securities Act in reliance on the exemptions provided by Section 4(2) of the Securities Act.

On June 25, 2009 and September 30, 2009, the Company and Tokyo Electron Ventures (“TEL VC”) entered into an exchange agreements whereby the Company issued 1,944,444 shares and 277,778 shares, respectively, of restricted common stock to TEL VC in exchange for an aggregate of 1,111,111 shares of Unidym Series C Preferred Stock and 1,111,111 shares of Unidym Series C-1 Preferred Stock. TEL VC is an accredited investor and the offering was exempt from registration under the Securities Act in reliance on the exemptions provided by Section 4(2) of the Securities Act.

On July 17, 2009 and August 6, 2009, the Company completed the closing of a private placement (the “Private Placement”) of an aggregate of 9,196,642 shares (the “Shares”) of its common stock, \$0.001 par value per share (“Common Stock”), at a price of \$0.30 per share, and warrants to purchase up to an additional 9,196,642 shares of Common Stock (the “Warrants”), exercisable at \$0.50 per share. The Warrants become exercisable in January 2010 and remain exercisable until June 17, 2014, unless redeemed earlier as permitted. The warrants may be redeemed for nominal consideration if the Company’s common stock trades above \$1.20 for at least 30 trading days in any 60-trading day period. Gross proceeds of the Private Placement totaled approximately \$2.75 million and proceeds net of commissions were approximately \$2.5 million. The Shares and Warrants were offered and sold only to accredited investors in reliance on Section 4(2) of the Securities Act and Rule 506 promulgated thereunder.

In September and October, 2009, pursuant to the terms of several exchange agreements, the Company issued 795,449 shares of Common Stock in exchange for 5,574 shares of Series A Preferred Stock and 789,700 shares of Series C Preferred Stock of Unidym, with several minority stockholders of Unidym. The shares were exchanged with several Unidym Series A and Series C Preferred stockholders. The exchange of shares was offered to accredited investors and the offering was exempt from registration under the Securities Act in reliance on the exemptions provided by Section 4(2) of the Securities Act.

On October 6, 2009, pursuant to the terms of an exchange agreement dated September 28, 2009, the Company issued 1,140,000 shares of Common Stock and warrants to purchase 240,000 shares of Common Stock in exchange for an 2,850,000 shares of Calando Common Stock and warrants to purchase 600,000 shares of the Calando common stock. The shares were exchanged with several Calando stockholders. The exchange of shares was offered to accredited investors and the offering was exempt from registration under the Securities Act in reliance on the exemptions provided by Section 4(2) of the Securities Act.

On December 11, 2009, the Company executed definitive agreements for the purchase of an aggregate of 5,083,502 units, each unit consisting of one share of Common Stock and a warrant to purchase an additional share of Common Stock (the “Warrants”), at a per unit price of \$0.634 per share. The Warrants are exercisable at \$0.509 per share, become exercisable on June 12, 2010 and remain exercisable until December 12, 2014, unless redeemed earlier as permitted. The warrants may be redeemed for nominal consideration if the Company’s Common Stock trades above \$1.20 for at least 30 trading days in any 60-trading day period. Gross proceeds of the private placement totaled approximately \$3.2 million, less expenses of \$25,000. The Shares and Warrants were offered and sold only to accredited investors in reliance on Section 4(2) of the Securities Act and Rule 506 promulgated thereunder.

## [Table of Contents](#)

### **Item 16. Exhibits.**

See Exhibit Index set forth on page II-6 to this Registration Statement.

### **Item 17. Undertakings.**

The undersigned 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 of 1933;

(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 percent 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;

(2) That, for the purpose of determining any liability under the Securities Act of 1933, 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.

(4) That, for the purpose of determining liability under the Securities Act of 1933 to any purchaser: each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness; *provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 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 Securities and Exchange 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 Act and will be governed by the final adjudication of such issue.



**EXHIBIT INDEX**

<u>Exhibit Number</u>	<u>Document Description</u>
3.1	Certificate of Incorporation of InterActive, Inc., a Delaware corporation, dated December 15, 2000. (1)
3.2	Certificate of Amendment of Certificate of Incorporation of InterActive Group, Inc., dated December 12, 2003 (effecting, among other things a change in the corporation's name to "Arrowhead Research Corporation"). (2)
3.3	Certificate of Amendment to Certificate of Incorporation of Arrowhead Research Corporation, dated January 25, 2005. (3)
3.4	Certificate of Amendment to Certificate of Incorporation of Arrowhead Research Corporation, dated October 13, 2009. (20)
3.5	Bylaws. (1)
4.1	Form of Registration Rights Agreement dated July 17, 2009. (4)
4.2	Form of Registration Rights Agreement dated December 11, 2009. (20)
4.3	Form of Warrant to Purchase Common Stock expiring January 24, 2011. (5)
4.4	Form of Common Stock Warrant expiring in August 2013. (6)
4.5	Form of Common Stock Warrant expiring in September 2013. (7)

## Table of Contents

4.6	Form of Warrant to Purchase Capital Stock expiring June 30, 2014. (4)
4.7	Form of Warrant to Purchase Capital Stock expiring December 2014. (20)
4.8	Form of Warrant to Purchase Common Stock expiring May 29, 2017. (8)
4.9	Form of Common Stock Certificate. (9)
5.1	Opinion of Goodwin Procter LLP.*
10.1**	Copy of the Arrowhead Research Corporation (fka InterActive, Inc.) 2000 Stock Option Plan, the Arrowhead Research Corporation Stock Option Agreement (Incentive Stock Option) and the Arrowhead Research Corporation Stock Option Agreement (Nonstatutory Option). (1)
10.2**	Copy of the Arrowhead Research Corporation 2004 Equity Incentive Plan, as amended (10)
10.3**	Executive Incentive Plan, adopted December 12, 2006. (11)
10.4**	Directors Compensation Policy (10)
10.5**	Severance Agreement dated May 24, 2007 by and between Arrowhead and R. Bruce Stewart. (12)
10.6**	Amendment to Severance Agreement between Arrowhead and R. Bruce Stewart, effective May 12, 2009. (20)
10.7**	Employment Agreement, between Arrowhead and Dr. Christopher Anzalone, dated June 11, 2008. (13)
10.8**	Amendment to Employment Agreement between Arrowhead and Dr. Christopher Anzalone, effective May 12, 2009. (20)

## Table of Contents

10.9	Insert Therapeutics, Inc. Amended and Restated Investors' Rights Agreement, dated April 17, 2008. (14)
10.10	Agreement and Plan of Merger by and among AmberWave Systems Corporation, Aonex Acquisition Corporation, Aonex Technologies, Inc. and the stockholders signatory thereto, dated May 5, 2008. (15)
10.11	Second Amended and Restated Investors' Rights Agreement, dated as of July 23, 2008, by and between Nanotope, Inc. and the Investors and Stockholders listed therein. (16)
10.12	Form of Unsecured Convertible Promissory Note Agreement dated November 26, 2008. (17)
10.13	Exchange Agreement dated February 25, 2009 by and among Arrowhead and several holders of Unidym, Inc. Series A Preferred Stock. (18)
10.14	Form of Subscription Agreement dated July 17, 2009 and August 6, 2009. (4)
10.15	Platform Agreement, dated as of June 23, 2009, by and between Calando Pharmaceuticals, Inc. and Cerulean Pharma Inc.† (19)
10.16	IT-101 Agreement, dated as of June 23, 2009, by and between Calando Pharmaceuticals, Inc. and Cerulean Pharma, Inc.† (19)
10.17	IP Transfer and Waiver Agreement, dated as of June 25, 2009, by and between Unidym, Inc. and TEL Venture Capital (19)
10.18	Subscription Agreement, dated as of June 25, 2009, by and between Arrowhead Research Corporation and Unidym, Inc.(19)

## Table of Contents

10.19	Exchange Agreement, dated as of June 25, 2009, by and between Arrowhead Research Corporation and TEL Venture Capital (19)
10.20	Form of Subscription Agreement between Arrowhead Research Corporation and several investors dated July 17, 2009 and August 6, 2009. (4)
10.21	Subscription Agreement, dated as of July 30, 2009, by and between Arrowhead Research Corporation and Unidym, Inc. (19)
10.22	Form of Subscription Agreement, dated as of September 30, 2009, by and between Arrowhead Research Corporation and Unidym, Inc. (20)
10.23	Second Amended and Restated Investor Rights Agreement among Unidym, Inc., Investors and the stockholders party thereto, dated September 30, 2009 (20)
10.24	Form of Subscription Agreement between Arrowhead Research Corporation and several investors dated December 11, 2009. (20)
21.1	List of Subsidiaries. (20)
23.1	Consent of Independent Public Registered Accounting Firm.*
23.2	Consent of Goodwin Procter LLP (included in legal opinion filed as Exhibit 5.1).*
24.1	Power of Attorney (contained on signature page).
99.1	Financial Statement Schedules. (20)

\* Filed herewith

\*\* Indicates compensation plan, contract or arrangement.

† Confidential treatment has been requested with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

(1) Incorporated by reference from the Schedule 14C, filed by the registrant on December 22, 2000.

## Table of Contents

- (2) Incorporated by reference from the Schedule 14C, filed by the registrant on December 22, 2003.
- (3) Incorporated by reference from the Quarterly Report on Form 10-QSB for the quarter ended December 31, 2004, filed by the registrant on February 11, 2005.
- (4) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on July 17, 2009.
- (5) Incorporated by reference from the Current Report on Form 8-K, filed by registrant on January 18, 2006.
- (6) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on August 26, 2008.
- (7) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on September 11, 2008.
- (8) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on May 30, 2007.
- (9) Incorporated by reference from Amendment No. 2 to the Registration Statement on Form S-1, filed by the registrant on September 11, 2009.
- (10) Incorporated by reference from the definitive Schedule 14C filed by registrant on September 9, 2009.
- (11) Incorporated by reference from the Annual Report on Form 10-K, filed by the registrant on December 14, 2006.
- (12) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on May 30, 2007.
- (13) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on June 13, 2008.
- (14) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on April 23, 2008.
- (15) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on May 9, 2008.
- (16) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on July 25, 2008.
- (17) Incorporated by reference from the Current Report on Form 8-K, filed by the registrant on December 3, 2008.
- (18) Incorporated by reference from the Quarterly Report on Form 10-Q, filed by the registrant on May 15, 2009.
- (19) Incorporated by reference from the Quarterly Report on Form 10-Q, filed by the registrant on August 10, 2009.
- (20) Incorporated by reference from the Annual Report on Form 10-K, filed by the registrant on December 22, 2009.



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December 28, 2009

Arrowhead Research Corporation  
201 South Lake Avenue  
Pasadena, CA 91101

Re: Securities Being Registered under Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion letter is furnished to you in connection with your filing of a Registration Statement on Form S-1 on or about December 28, 2009 (as amended or supplemented, the "Registration Statement") pursuant to the Securities Act of 1933, as amended, relating to the registration by Arrowhead Research Corporation, a Delaware corporation (the "Company") of the resale of up to 19,363,502 shares (the "Shares") of the Company's common stock, \$0.001 par value per share (the "Common Stock"), including 9,196,642 shares of Common Stock issuable upon exercise of Common Stock Warrants (the "Warrants"), as described in the Registration Statement.

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinions expressed 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 opinion expressed below is limited to the Delaware General Corporation Law (which includes applicable provisions of the Delaware Constitution and reported judicial decisions interpreting the Delaware General Corporation Law and the Delaware Constitution).

For purposes of the opinion expressed below, and without limiting any other exceptions or qualifications set forth herein, we have assumed that after the issuance of the Shares underlying the Warrants (the "Warrant Shares"), the total number of issued and outstanding shares of the Company's Common Stock, together with the total number of shares of the Company's Common Stock reserved for issuance upon the exercise, exchange or conversion, as the case may be, of any exercisable, exchangeable or convertible security, as the case may be, then outstanding, will not exceed the total number of authorized shares of Common Stock under the Company's Certificate of Incorporation, as amended and then in effect.

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

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

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We hereby consent to the incorporation by reference, in this Registration Statement on Form S-1 of our report dated December 21, 2009, with respect to the financial statements of Arrowhead Research Corporation and Subsidiaries appearing in the Company's Annual Report on Form 10-K for the year ended September 30, 2009, and to the reference to our Firm under the caption "Experts" in the Prospectus.

/s/ Rose, Snyder & Jacobs  
Rose, Snyder & Jacobs

A Corporation of Certified Public Accounts

Encino, California

December 24, 2009