UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended June 30, 2020

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission File Number: 001-38942

ARCTURUS THERAPEUTICS HOLDINGS INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**32-0595345** **(I.R.S. Employer Identification No.)**
10628 Science Center Drive, Suite 250 **San Diego, California** **(Address of principal executive offices)**	**92121** **(Zip Code)**

Registrant's telephone number, including area code: (858) 900-2660

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock, par value $0.001 per share	ARCT	The NASDAQ Stock Market LLC

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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	☐	Smaller reporting company	☒
Emerging growth company	☐		

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of August 5, 2020, the registrant had 24,388,176 shares of voting common stock outstanding.

ARCTURUS THERAPEUTICS HOLDINGS INC. AND ITS SUBSIDIARIES

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Item 1. Financial Statements.

ARCTURUS THERAPEUTICS HOLDINGS INC. AND ITS SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except par value information)

	June 30, 2020 (unaudited)	December 31, 2019
Assets		
Current assets:		
Cash and cash equivalents	$ 136,111	$ 71,353
Accounts receivable	2,829	2,179
Prepaid expenses and other current assets	3,060	758
Total current assets	142,000	74,290
Property and equipment, net	2,610	2,349
Operating lease right-of-use asset, net	5,218	5,134
Equity-method investment	—	263
Non-current restricted cash	107	107
Total assets	$ 149,935	$ 82,143
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 4,395	$ 5,793
Accrued liabilities	11,883	7,134
Deferred revenue	6,768	8,397
Total current liabilities	23,046	21,324
Deferred revenue, net of current portion	14,013	15,182
Long-term debt	15,059	14,995
Operating lease liability, net of current portion	4,394	4,850
Total liabilities	$ 56,512	$ 56,351
Stockholders' equity		
Common stock: $0.001 par value; 30,000 shares authorized; 20,610 and 15,138 issued and outstanding at June 30, 2020 and December 31, 2019, respectively.	21	15
Additional paid-in capital	185,110	97,445
Accumulated deficit	(91,708)	(71,668)
Total stockholders' equity	93,423	25,792
Total liabilities and stockholders' equity	$ 149,935	$ 82,143

The accompanying notes are an integral part of these condensed consolidated financial statements.

ARCTURUS THERAPEUTICS HOLDINGS INC. AND ITS SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(unaudited)
(in thousands, except per share data)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2020	2019	2020	2019
Collaboration revenue	$ 2,322	$ 10,153	$ 4,968	$ 14,503
Operating expenses:				
Research and development, net	7,944	7,269	15,861	14,593
General and administrative	4,420	3,456	8,611	6,990
Total operating expenses	12,364	10,725	24,472	21,583
Loss from operations	(10,042)	(572)	(19,504)	(7,080)
Loss from equity-method investment	(100)	—	(263)	(288)
Finance expense, net	(121)	(113)	(273)	(201)
Net loss	$ (10,263)	$ (685)	$ (20,040)	$ (7,569)
Net loss per share, basic and diluted	$ (0.55)	$ (0.07)	$ (1.20)	$ (0.74)
Weighted-average shares outstanding, basic and diluted	18,794	10,412	16,657	10,255
Comprehensive loss:				
Net loss	$ (10,263)	$ (685)	$ (20,040)	$ (7,569)
Comprehensive loss	$ (10,263)	$ (685)	$ (20,040)	$ (7,569)

The accompanying notes are an integral part of these condensed consolidated financial statements.

ARCTURUS THERAPEUTICS HOLDINGS INC. AND ITS SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(unaudited)
in thousands

Three Months Ended June 30, 2020

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
BALANCE - March 31, 2020	**15,157**	**$ 15**	**$ 98,412**	**$ (81,445)**	**$ 16,982**
Net loss	—	—	—	(10,263)	(10,263)
Issuance of common stock, net of issuance costs	4,735	5	75,300	—	75,305
Issuance of common stock to Ultragenyx on option exercise	600	1	9,599	—	9,600
Issuance of common stock upon exercise of stock options	118	—	698	—	698
Share-based compensation	—	—	1,101	—	1,101
BALANCE – June 30, 2020	**20,610**	**$ 21**	**$ 185,110**	**$ (91,708)**	**$ 93,423**

Three Months Ended June 30, 2019

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
BALANCE - March 31, 2019	**10,762**	**$ 214**	**$ 58,701**	**$ (52,561)**	**$ 6,354**
Net loss	—	—	—	(685)	(685)
Treasury Stock	(43)	—	—	—	—
Issuance of common stock upon exercise of stock options	1	—	1		1
Share-based compensation	—	—	403	—	403
Redomiciliation share exchange	—	(203)	203	—	—
Issuance of common stock to Ultragenyx and option, net of issuance costs	2,400	2	15,543	—	15,545
BALANCE – June 30, 2019	**13,120**	**$ 13**	**$ 74,851**	**$ (53,246)**	**$ 21,618**

Six Months Ended June 30, 2020

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
BALANCE - December 31, 2019	**15,138**	**$ 15**	**$ 97,445**	**$ (71,668)**	**$ 25,792**
Net loss	—	—	—	(20,040)	(20,040)
Issuance of common stock, net of issuance costs	4,735	5	75,300	—	75,305
Issuance of common stock to Ultragenyx on option exercise	600	1	9,599	—	9,600
Issuance of common stock upon exercise of stock options	137	—	816	—	816
Share-based compensation	—	—	1,950	—	1,950
BALANCE – June 30, 2020	**20,610**	**$ 21**	**$ 185,110**	**$ (91,708)**	**$ 93,423**

Six Months Ended June 30, 2019

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
BALANCE – December 31, 2018	**10,762**	**$ 214**	**$ 58,302**	**$ (44,874)**	**$ 13,642**
Net loss	—	—	—	(7,569)	(7,569)
Treasury Stock	(43)	—	—	—	
Issuance of common stock upon exercise of stock options	1	—	1	—	1
Share-based compensation	—	—	802	—	802
Redomiciliation share exchange	—	(203)	203	—	—
Issuance of common stock to Ultragenyx and option, net of issuance costs	2,400	2	15,543	—	15,545
Effect of adoption of ASU 2014-09	—	—	—	(803)	(803)
BALANCE – June 30, 2019	**13,120**	**$ 13**	**$ 74,851**	**$ (53,246)**	**$ 21,618**

The accompanying notes are an integral part of these condensed consolidated financial statements.

ARCTURUS THERAPEUTICS HOLDINGS INC. AND ITS SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(unaudited)
in thousands

	Six Months Ended June 30,	
	2020	**2019**
OPERATING ACTIVITIES:		
Net loss	$ (20,040)	$ (7,569)
Adjustments to reconcile net loss to net cash (used in) provided by operating activities:		
Depreciation and amortization	394	349
Share-based compensation expense	1,950	802
Loss from equity-method investment	263	288
Other non-cash interest expense	654	428
Changes in operating assets and liabilities		
Accounts receivable	(650)	(1,336)
Prepaid expense and other assets	(2,302)	(1,043)
Accounts payable	(1,442)	773
Accrued liabilities	3,619	(1,536)
Deferred revenue	(2,798)	12,773
Net cash (used in) provided by operating activities	(20,352)	3,929
INVESTING ACTIVITIES:		
Acquisition of property and equipment	(611)	(344)
Net cash used in investing activities	(611)	(344)
FINANCING ACTIVITIES:		
Proceeds from issuance of common stock, net of issuance costs	75,305	—
Proceeds from the issuance of common stock to Ultragenyx on option exercise	9,600	15,545
Proceeds from exercise of stock options	816	1
Net cash provided by financing activities	85,721	15,546
NET INCREASE IN CASH, CASH EQUIVALENTS AND RESTRICTED CASH	64,758	19,131
Cash, cash equivalents and restricted cash at beginning of the period	71,460	36,816
Cash, cash equivalents and restricted cash at end of the period	$ 136,218	$ 55,947

	Six Months Ended June 30,	
	2020	**2019**
Supplemental disclosure of cash flow information		
Cash paid for interest	$ 180	$ 340
Non-cash investing activities		
Right-of-use asset obtained in exchange for lease liabilities	$ 674	$ 5,868
Purchase of property and equipment in accounts payable	$ 44	$ 16

The accompanying notes are an integral part of these condensed consolidated financial statements.

Note 1. Description of Business, Basis of Presentation and Summary of Significant Accounting Policies

Description of Business

Arcturus Therapeutics Holdings Inc. (the "Company") is a messenger RNA medicines company focused on significant opportunities within liver and respiratory rare diseases, and the development of infectious disease vaccines utilizing its Self-Transcribing and Replicating RNA ("STARR") technology. In addition to the Company's internal messenger RNA ("mRNA") platform, its proprietary lipid nanoparticle delivery system, LUNAR, has the potential to enable multiple nucleic acid medicines.

In April 2020, the Company became a clinical stage Company when it announced that its Investigational New Drug ("IND") application for a Phase 1b study in patients with ornithine transcarbamylase ("OTC") deficiency was deemed allowed to proceed by the U.S. Food and Drug Administration ("FDA"), and an additional Clinical Trial Application ("CTA") for a Phase 1 study in healthy volunteers was approved by the New Zealand Medicines and Medical Devices Safety Authority.

In March 2020, the Company was awarded a grant (the "Grant") from the Singapore Economic Development Board to support the co-development of a potential COVID-19 vaccine with the Duke-NUS Medical School. The grant provides for up to S$14.0 million (approximately US$10 million using the exchange rate at the time the grant contract was entered into) in grants to support the development of the vaccine. A portion of the Grant will be paid by the Economic Development Board in advance and the remainder of the Grant will be paid to the Company upon the achievement of certain milestones related to the progress of the development of the vaccine, as set forth in the award agreement. The Company has agreed to pay Duke-NUS Medical School a royalty based on annual net sales of the vaccine in markets or jurisdictions outside of Singapore. In July 2020, the Company and Duke-NUS Medical School announced that the CTA for COVID-19 vaccine candidate LUNAR-COV19 had been approved to proceed by the Singapore Health Sciences Authority ("HSA").

Basis of Presentation

The financial statements for periods prior to June 17, 2019, the effective date of the Company's Redomiciliation to the United States (as described in our annual report on Form 10-K for the year ended December 31, 2019 (the "2019 Annual Report")), relate to our predecessor, Arcturus Therapeutics Ltd., and for the periods from and after June 17, 2019 relate to Arcturus Therapeutics Holdings Inc. Unless stated otherwise or the context otherwise requires, references to the "Company," "Arcturus," "we," "our" and "us" mean Arcturus Therapeutics Holdings Inc. and its consolidated subsidiaries from and after the effective time of the Redomiciliation and, prior to that time Arcturus Therapeutics Ltd.

The accompanying condensed consolidated financial statements include the accounts of Arcturus Therapeutics Holdings Inc. and its subsidiaries and are unaudited. All intercompany accounts and transactions have been eliminated in consolidation. These condensed consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP") for interim financial information. Accordingly, they do not include all of the information and footnotes required by GAAP for complete financial statements. In management's opinion, the accompanying condensed consolidated financial statements reflect all adjustments, consisting of normal recurring adjustments, considered necessary for a fair presentation of the results for the interim periods presented.

Interim financial results are not necessarily indicative of results anticipated for the full year. These condensed consolidated financial statements should be read in conjunction with the audited financial statements and footnotes included in the Company's Annual Report on Form 10-K for the year ended December 31, 2019.

These condensed consolidated financial statements are prepared in accordance with GAAP, which requires management to make estimates and assumptions regarding the valuation of certain debt and equity instruments, the equity-method investment, share-based compensation, accruals for liabilities, deferred revenue, expense accruals, and other matters that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Although these estimates are based on management's knowledge of current events and actions the Company may undertake in the future, actual results may ultimately differ from these estimates and assumptions.

Liquidity

The Company's activities since inception have consisted principally of performing research and development activities, general and administration activities, and raising capital. The Company's activities are subject to significant risks and uncertainties, including failing to secure additional funding before the Company achieves sustainable revenues and profit from operations.

The Company is a clinical-stage bioscience company that is dependent on obtaining external equity and debt financings to fund its operations. Historically, the Company's primary sources of financing have been through the sale of its securities, through issuance of debt and through collaboration agreements.

As mentioned above, the Company was recently awarded a grant from the Singapore Economic Development Board of up to approximately $10.0 million to support the co-development of a potential COVID-19 vaccine with the Duke-NUS Medical School, approximately $5.0 million of which was awarded during the quarter ended March 31, 2020 and subsequently received in April 2020. Additionally, in April 2020 the Company completed an underwritten public offering of 4,735,297 shares of common stock (including the underwriters' overallotment option) at a price of $17.00 per share. The Company received net proceeds of approximately $75.5 million in the offering.

In May 2020, Ultragenyx exercised its option to purchase 600,000 shares of the Company's common stock at $16 per share. The Company received proceeds of $9.6 million as a result of the option exercise.

In July 2020 the Company completed an additional underwritten public offering of 4,243,395 shares of common stock (including the underwriters' overallotment option) at a price of $53.00 per share. The Company received net proceeds of approximately $186.3 million in the offering.

Segment Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker in making decisions regarding resource allocation and assessing performance. The Company and its chief operating decision-maker view the Company's operations and manage its business in one operating segment, which is the research and development of medical applications for the Company's nucleic acid-focused technology.

Revenue Recognition

Effective January 1, 2019, the Company adopted *Accounting Standards Update ("ASU") 2014-09, Revenue from Contracts with Customers (Topic 606)* ("Topic 606"), using the modified retrospective transition method. Topic 606 provides a unified model to determine how revenue is recognized and the Company applied the standard to collaborative research and technology agreements that were in progress as of the effective date, January 1, 2019. The Company determines revenue recognition for arrangements within the scope of Topic 606 by performing the following five steps: (i) identify the contract; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when, or as, the company satisfies a performance obligation.

The terms of the Company's collaborative research and development agreements include license fees, upfront payments, milestone payments, and reimbursement for research and development activities, option exercise fees, and royalties on sales of commercialized products. Arrangements that include upfront payments are recorded as deferred revenue upon receipt or when due and may require deferral of revenue recognition to a future period until the Company performs obligations under these arrangements. The event-based milestone payments represent variable consideration, and the Company uses the most likely amount method to estimate this variable consideration because the Company will either receive the milestone payment or will not, which makes the potential milestone payment a binary event. The most likely amount method requires the Company to determine the likelihood of earning the milestone payment. Given the high degree of uncertainty around achievement of these milestones, the Company determines the milestone amounts to be fully constrained and does not recognize revenue until the uncertainty associated with these payments is resolved. The Company will recognize revenue from sales-based royalty payments when or as the sales occur. The Company will re-evaluate the transaction price in each reporting period as uncertain events are resolved and other changes in circumstances occur.

A performance obligation is a promise in a contract to transfer a distinct good or service to the collaborative partner and is the unit of account in Topic 606. A contract's transaction price is allocated to each distinct performance obligation based on relative standalone selling price and recognized as revenue when, or as, the performance obligation is satisfied.

See *"Note 2, Collaboration Revenue"* for specific details surrounding the Company's collaboration arrangements.

Leases

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842), which requires lessees to recognize most leases on the balance sheet as lease liabilities with corresponding right-of-use assets and to disclose key information about leasing arrangements. The Company adopted Topic 842 on its effective date in the first quarter of 2019 using a modified retrospective approach. The Company elected the available package of practical expedients upon adoption, which allowed it to carry forward historical assessments of whether existing agreements contained a lease and the classification of existing operating leases.

See *"Note 8, Commitments and Contingences"* for specific details surrounding the Company's leases.

Research and Development, Net

Research and development costs are expensed as incurred. These expenses result from the Company's independent research and development efforts as well as efforts associated with collaboration arrangements. Research and development costs include salaries and personnel-related costs, consulting fees, fees paid for contract research and manufacturing services, the costs of laboratory supplies, equipment and facilities, preclinical studies and other external costs are shown net of any grants.

Statement of Cash Flows

The following table provides a reconciliation of cash and cash equivalents and restricted cash reported within the condensed consolidated balance sheet to the total of the same such amounts shown in the condensed consolidated statement of cash flows:

(in thousands)	June 30, 2020	June 30, 2019
Cash and cash equivalents	$ 136,111	$ 55,840
Non-current restricted cash	107	107
Total cash, cash equivalents and restricted cash shown in the statement of cash flows	$ 136,218	$ 55,947

Net Loss per Share

Basic net loss per share is calculated by dividing the net loss by the weighted-average number of shares of common stock outstanding for the period, without consideration for common stock equivalents. Diluted net loss per share is calculated by dividing the net loss by the weighted-average number of shares of common stock and dilutive common stock equivalents outstanding for the period determined using the treasury-stock method. Dilutive shares of common stock are comprised of stock options.

No dividends were declared or paid during the reported periods.

Note 2. Collaboration Revenue

The Company has entered into license agreements and collaborative research and development arrangements with pharmaceutical and biotechnology companies. Under these arrangements, the Company is entitled to receive license fees, upfront payments, milestone payments if and when certain research and development milestones or technology transfer milestones are achieved, royalties on approved product sales and reimbursement for research and development activities. The Company's costs of performing these services are included within research and development expenses. The Company's milestone payments are typically defined by achievement of certain preclinical, clinical, and commercial success criteria. Preclinical milestones may include in vivo proof of concept in disease animal models, lead candidate identification, and completion of IND-enabling toxicology studies. Clinical milestones may, for example, include successful enrollment of the first patient in or completion of Phase I, II, and III clinical trials, and commercial milestones are often tiered based on net or aggregate sale amounts. The Company cannot guarantee the achievement of these milestones due to risks associated with preclinical and clinical activities required for development of nucleic acid medicine-based therapeutics.

The following table presents changes during the six months ended June 30, 2020 in the balances of contract assets, including receivables from collaborative partners, and contract liabilities, including deferred revenue, as compared to what was disclosed in the Company's 2019 Annual Report.

(in thousands)	Contract Assets
BALANCE - December 31, 2019	$ 2,179
Additions for revenue recognized from billings	2,171
Deductions for cash collections	(1,521)
BALANCE – June 30, 2020	$ 2,829

(in thousands)	Contract Liabilities
BALANCE - December 31, 2019	$ 23,579
Additions for advanced billings	2,171
Deductions for promised services provided in current period	(4,969)
BALANCE – June 30, 2020	$ 20,781

The following table summarizes the Company's collaboration revenues for the periods indicated (in thousands).

(Dollars in thousands)	For the Three Months Ended June 30, 2020	For the Three Months Ended June 30, 2019	For the Six Months Ended June 30, 2020	For the Six Months Ended June 30, 2019
Collaboration Partner – Janssen	$ 693	$ 622	$ 1,590	$ 1,135
Collaboration Partner – Ultragenyx	913	2,544	1,824	3,932
Collaboration Partner – CureVac	231	3,409	540	5,303
Collaboration Partner – Other	485	3,578	1,014	4,133
Total collaboration revenue	$ 2,322	$ 10,153	$ 4,968	$ 14,503

The following paragraphs provide information regarding the nature and purpose of the Company's most significant collaboration arrangements.

Collaboration Partner – Janssen

In October 2017, the Company entered into a research collaboration and license agreement with Janssen (the "2017 Agreement"). The 2017 Agreement allocated discovery, development, funding obligations, and ownership of related intellectual property among the Company and Janssen Pharmaceuticals, Inc. ("Janssen"). The Company received an upfront payment of $7.7 million and may receive preclinical, development and sales milestone payments of $56.5 million, as well as royalty payments on any future licensed product sales. Janssen began reimbursing the Company for research costs during the first quarter of 2019 upon the completion of the first of three research periods. Janssen may also pay option exercise fees within the $1.0 million to $5.0 million range per target. Janssen will pay royalties on annual net sales of licensed products in the low to mid-single digits range, subject to reduction on a country-by-country and licensed-product-by-licensed-product basis and subject to certain events, such as expiration of program patents. In addition, the 2017 Agreement includes an exclusivity period.

In evaluating the 2017 Agreement in accordance with ASC Topic 606, the Company concluded that the contract counterparty, Janssen, is a customer. The Company identified the following promised goods/services as of the inception of the Agreement: (i) research services, (ii) license to use Arcturus technology and (iii) participation in the Joint Research Committee. The Company concluded that the promised goods/services are incapable of being distinct and consequently do not have any value on a standalone basis. Accordingly, they are determined to represent a single performance obligation. The Company concluded that Janssen's options to select additional collaboration targets and to license rights to selected targets are not priced at a discount and therefore do not represent performance obligations for which the transaction price would be allocated.

As of June 30, 2020, the remaining transaction price, consisting of upfront consideration received and budgeted reimbursable out-of-pocket costs, is expected to be recognized using an input method over the remaining research period of 27 months. None of the development and commercialization milestones were included in the transaction price, as all milestone amounts were not estimated to be met, are outside the control of the Company and contingent upon success in future clinical trials and the collaborator's efforts. Any consideration related to sales-based royalties will be recognized when the related sales occur, provided that the reported sales are reliably measurable, and the Company has no remaining promised goods/services, as such sales were determined to relate predominantly to the license granted to Janssen and therefore have also been excluded from the transaction price.

Total deferred revenue as of June 30, 2020 and December 31, 2019 for Janssen was $6.0 million and $5.9 million, respectively.

Collaboration Partner – Ultragenyx

In October 2015 the Company entered into a research collaboration and license agreement with Ultragenyx (the "Ultragenyx Agreement"), whereby Arcturus granted to Ultragenyx a co-exclusive license under Arcturus technology and shall be in effect only during the reserve target exclusivity term as discussed in the following paragraphs. This collaboration agreement was amended in 2017, 2018 and during the second quarter of 2019. During the initial phase of the collaboration, the Company will design and optimize therapeutics for certain rare disease targets. Ultragenyx has the option under the Ultragenyx Agreement to add additional rare disease targets during the collaborative development period. Additionally, during the collaborative development period, the Company will participate with Ultragenyx in a joint steering committee. The Ultragenyx Agreement also includes an initial exclusivity period with an option to extend this period.

As part of the Ultragenyx Agreement and related amendments, Ultragenyx has paid $27.9 million in upfront fees, exclusivity extension fees and additional consideration. Ultragenyx also reimburses the Company for all internal and external development costs incurred. Pursuant to the Ultragenyx Agreement, Ultragenyx is required to make additional payments upon exercise of the Ultragenyx expansion option or exclusivity extension (if any) and if Ultragenyx achieves certain, clinical, regulatory and sales milestones, then the Company is eligible to receive royalty payments. For each development target for which Ultragenyx exercises its option, Ultragenyx will pay the Company a one-time option exercise fee that increases based upon the number of development targets selected by Ultragenyx from $0.5 million to $1.5 million.

The current potential development, regulatory and commercial milestone payments for the existing development targets as of June 30, 2020 are $138.0 million. Ultragenyx will pay royalties as a single-digit percentage of net sales on a product-by-product and country-by-country basis during the applicable royalty term. As of June 30, 2020, Ultragenyx has not yet reached the clinical phase of the contract.

On June 18, 2019, Arcturus and Ultragenyx amended the collaboration agreement for a third time (“Amendment 3”). As part of Amendment 3, the total number of targets was increased from 10 to 12, and reserve targets will be exclusively reserved for Ultragenyx with no fees for four years after execution of the amendment. An equity component was also added as part of Amendment 3 wherein Ultragenyx purchased 2.4 million shares of common stock at a premium price. Along with the equity purchase, Ultragenyx received an option to purchase 0.6 million additional shares of common stock at $16 per share (Note 6). In May 2020, the option was exercised.

The consideration received from Ultragenyx as a result of Amendment 3 was equal to $30.0 million and was comprised of a $24.0 million common stock purchase and a $6.0 million upfront payment. Specifically for Amendment 3, management determined the transaction price to be $14.4 million. See further discussion below regarding determining the transaction price. Management determined the fair value of the premium received by using the opening stock price subsequent to execution of Amendment 3 and applying a lack of marketability discount as the shares received by Ultragenyx were initially restricted for up to two years. Pursuant to the terms of the equity purchase agreement between the Company and Ultragenyx, the transfer restrictions will terminate on November 20, 2020 as a result of the purchase of the 0.6 million option shares.

In evaluating the Ultragenyx agreement in accordance with ASC Topic 606, the Company concluded that the contract counterparty, Ultragenyx, is a customer. The Company has identified the following promised goods/services as part of the initial agreement and subsequent amendments: (i) research services, (ii) license to use Arcturus technology, (iii) exclusivity and (iv) participation in the Joint Steering Committee. The Company concluded that the promised goods/services are incapable of being distinct and consequently do not have any value on a standalone basis. Accordingly, they are determined to represent a single performance obligation. The Company concluded that Ultragenyx’s options to extend exclusivity and options to select additional collaboration targets and to license rights to selected targets are not priced at a discount and therefore do not represent performance obligations for which the transaction price would be allocated.

At June 30, 2020, the transaction price included the upfront consideration received, exclusivity extension payments and additional consideration received pursuant to Amendment 3. The Company recognizes the reimbursement of labor and expenses as costs are incurred and none of the development and commercialization milestones were included in the transaction price, as all milestone amounts were fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including that the consideration is outside the control of the Company and contingent upon success in future clinical trials, approval from the Food and Drug Administration and the collaborator’s efforts. Any consideration related to sales-based royalties will be recognized when the related sales occur as they are constrained, provided that the reported sales are reliably measurable and the Company has no remaining promised goods/services, as such sales were determined to relate predominantly to the license granted to Ultragenyx and therefore have also been excluded from the transaction price.

Amendment 3 was deemed a contract modification and accounted for as part of the original Ultragenyx Agreement and the Company recorded a cumulative catch-up adjustment of $1.1 million on the modification date. The transaction price will be recognized to revenue on a straight-line basis using an input method over the 4-year reserve target exclusivity period. The reserve target exclusivity period represents the timing over which promised goods/services will be provided. Total deferred revenue at June 30, 2020 and December 31, 2019 from Ultragenyx was $10.9 million and $12.7 million, respectively.

Collaboration Partner – CureVac

In January 2018, the Company entered into a Development and Option Agreement with CureVac, (the “Development and Option Agreement”). Under the terms of the Development and Option Agreement, the parties agreed to conduct joint preclinical development programs once CureVac makes a payment to pull down a target on the basis of which CureVac is granted options for taking a license on pre-agreed license terms to develop and commercialize certain products incorporating the Company’s patents and know-how related to delivery technology (the LUNAR platform) (the “Arcturus Delivery Technology”), and CureVac patents and know-how related to mRNA technology. Subject to certain restrictions, the parties will have an undivided one-half interest in the patents and know-how developed jointly by the parties during the course of the Development and Option Agreement. Pursuant to the terms of the Development and Option Agreement, CureVac will have a number of target options to co-develop from a reserved target

list to enter into licenses under the Arcturus Delivery Technology with respect to the development, manufacture and commercialization of licensed products (which can include products identified for development by the Company, unless the Company is permitted by the terms of the Development and Option Agreement to place such products on a restricted list). A separate notice and fee will be required for each license agreement. If the target to which the license agreement relates is chosen by the parties for co-development under the Co-Development Agreement (as defined below and discussed in the following paragraph) the license agreement will terminate as such programs will be covered under the Co-Development Agreement discussed below, and therefore CureVac will be given a credit for any exercise fees, milestone payments already paid and all other payments made in relation to the license agreement towards future such payments incurred with respect to future licenses under the Arcturus Delivery Technology.

Prior to expiration of the initial term of 8 years (which was subsequently amended, as discussed below), the Agreement also includes an option to extend the term on an annual basis for up to 3 years, subject to payment by CureVac to Arcturus of a non-refundable annual extension fee. The agreement included potential milestone payments for selected targets from CureVac to the Company. The current potential milestone payments for the remaining targets as of June 30, 2020 are $14.0 million for rare disease targets and $23.0 million for non-rare disease targets. CureVac will pay royalties as a percentage of net sales on a product-by-product and country-by-country basis during the applicable royalty term in the low single-digit range. As of June 30, 2020, CureVac has not yet reached the clinical phase of the contract. Pursuant to a May 2018 amendment to the Development and Option Agreement (as amended and restated on September 28, 2018), the Company increased the number of targets available to CureVac under the Development and Option Agreement and agreed upon the license forms to be executed upon selection of the targets by CureVac.

Concurrently with the Development and Option Agreement, the Company entered into a Co-Development and Co-Commercialization Agreement (the “Co-Development Agreement”) which the Company considered a combined contract with the Development and Option Agreement for purposes of revenue recognition. However, on February 11, 2019, the Company announced the termination of the obligations of CureVac for the preclinical development of ARCT-810, effective as of August 4, 2019 and the re-assumption by the Company of the worldwide rights thereto. As a result, Arcturus reassumed 100% global rights for clinical development candidate ARCT-810, a messenger RNA (mRNA) drug to treat ornithine transcarbamylase deficiency.

On July 26, 2019, the Company entered into an amendment (“CureVac Amendment”) to its Development and Option Agreement with CureVac (as amended, the “Development and Option Agreement”), pursuant to which the Company and CureVac agreed to shorten the time period during which CureVac may select potential targets to be licensed from the Company from eight years to four years, and to reduce the overall number of maximum targets to be reserved and licensed.

In connection with the July 2019 CureVac Amendment, the Company and CureVac also entered into a Termination Agreement (the “Termination Agreement”) terminating the January 1, 2018 Co-Development Agreement between the Company and CureVac. Pursuant to the Termination Agreement CureVac agreed to make a one-time payment to Arcturus in the amount of $4.0 million, which was made in July 2019.

In evaluating the CureVac Development and Option Agreement and Co-Development Agreement in accordance with ASC Topic 606, the Company concluded that the contract counterparty, CureVac, is a customer. The Company has identified the following promised goods/services as part of the initial agreement with CureVac and subsequent amendments: (i) research services, (ii) license to use Arcturus technology, (iii) exclusivity and (iv) participation in the Joint Steering Committee. The Company concluded that the promised goods/services are incapable of being distinct and consequently do not have any value on a standalone basis. Accordingly, they are determined to represent a single performance obligation. The Company concluded that CureVac’s options to extend the research term and options to select additional collaboration targets and to license rights to selected targets are not priced at a discount and therefore do not represent performance obligations for which the transaction price would be allocated.

At June 30, 2020, the transaction price included the upfront consideration received. The Company recognizes the reimbursement of labor and expenses as costs are incurred and none of the development and commercialization milestones were included in the transaction price, as all milestone amounts were fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including that receipt of the milestones is outside the control of the Company and contingent upon success in future clinical trials and the collaborator’s efforts. Any consideration related to sales-based royalties will be recognized when the related sales occur as they are constrained, provided that the reported sales are reliably measurable and the Company has no remaining promised goods/services, as such sales were determined to relate predominantly to the license granted to CureVac and therefore have also been excluded from the transaction price. For the three months ended June 30, 2020, no adjustments were made to the transaction price.

The upfront consideration of $5.0 million was recorded as deferred revenue in the Company’s balance sheet upon receipt and is currently being recognized as revenue on a straight-line basis using an input method over the remaining 37 month contractual term as of June 30, 2020. As a result of Amendment 3, the Company recorded a cumulative catch up adjustment of $0.4 million on the modification date, July 26, 2019. Total deferred revenue as of June 30, 2020 and December 31, 2019 for CureVac was $2.8 million and $3.2 million, respectively. No adjustment was necessary upon adoption of Topic 606.

Other Collaboration Revenue

The remaining revenue from smaller collaboration agreements primarily relates to the agreements with Millennium Pharmaceuticals, Inc., a wholly owned subsidiary of Takeda Pharmaceutical Company Limited ("Takeda") and Synthetic Genomics, Inc. ("SGI"). Under the agreement with Takeda, the Company recognized $0.5 million during the first two quarters of 2020 which relates to the amortization of an upfront payment for research and development activities. The current agreement with Takeda was entered into on March 18, 2019 and is expected to be completed by the end of 2020. Under the agreement with SGI, the Company recognized $0.3 million during the second quarter of 2020 related to sublicensed technology.

Note 3. Fair Value Measurements

The Company establishes the fair value of its assets and liabilities using the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company establishes a fair value hierarchy based on the inputs used to measure fair value.

The three levels of the fair value hierarchy are as follows:

Level 1: Quoted prices in active markets for identical assets or liabilities.

Level 2: Inputs, other than the quoted prices in active markets, that are observable either directly or indirectly.

Level 3: Unobservable inputs in which little or no market data exists and are therefore determined using estimates and assumptions developed by the Company, which reflect those that a market participant would use.

The carrying value of cash, restricted cash, accounts receivable, accounts payable, and accrued liabilities approximate their respective fair values due to their relative short maturities. The carrying amounts of long-term debt for the amount drawn on the Company's debt facility approximates fair value as the interest rate is variable and reflects current market rates.

As of June 30, 2020 and December 31, 2019, all assets measured at fair value on a recurring basis consisted of cash equivalents, money market funds, which were classified within Level 1 of the fair value hierarchy. The fair value of these financial instruments was measured based on quoted prices.

Note 4. Balance Sheet Details

Property and equipment, net consisted of the following:

(in thousands)	June 30, 2020	December 31, 2019
Research equipment	$ 4,282	$ 3,658
Computers and software	285	271
Office equipment and furniture	574	561
Leasehold improvements	44	40
Total	5,185	4,530
Less accumulated depreciation and amortization	(2,575)	(2,181)
Property and equipment, net	$ 2,610	$ 2,349

Depreciation and amortization expense was $0.2 million and $0.2 million for the three months ended June 30, 2020 and 2019, respectively, and $0.4 million and $0.3 million for the six months ended June 30, 2020 and 2019, respectively.

Accrued liabilities consisted of the following as of June 30, 2020 and December 31, 2019:

(in thousands)	June 30, 2020	December 31, 2019
Accrued compensation	$ 2,234	$ 1,608
Cystic Fibrosis Foundation Liability	3,010	1,949
Singapore Economic Development Board Liability	672	—
Current portion of operating lease liability	1,337	827
Clinical Accruals	299	—
Other accrued research and development expenses	4,331	2,750
Total	$ 11,883	$ 7,134

Note 5. Debt

Long-term debt with Western Alliance Bank

On October 12, 2018, the Company entered into a Loan and Security Agreement with Western Alliance Bank (the "Bank"), whereby the Company received $10.0 million under a long-term debt agreement (the "Loan").

The Loan is collateralized by all of the assets of the Company, excluding intellectual property, which is subject to a negative pledge. The Loan contains customary conditions of borrowing, events of default and covenants, including covenants that restrict the Company's ability to dispose of assets, merge with or acquire other entities, incur indebtedness and make distributions to holders of the Company's capital stock. In addition, the Company is required to maintain at least 100% of its consolidated, unrestricted cash, or $15.0 million, whichever is lower, with the Bank.

On October 30, 2019, the Company and the Bank entered into a Third Amendment (the "Third Amendment") to the Loan and Security Agreement dated as of October 12, 2018 (as amended, the "Loan Agreement").

Pursuant to the amendment, the Bank agreed to make a term loan to the Company on October 30, 2019, in the amount of $15.0 million (the "Term Loan"). The resulting net increase in the indebtedness of the Company was $5.0 million. The Term Loan bears interest at a floating rate ranging from 1.25% to 2.75% above the prime rate. The amendment further provides that the Term Loan has a maturity date of October 30, 2023. The Company shall make monthly payments of interest only until the interest-only end date of October 1, 2021.

The Company paid a loan origination fee of $54,000 which was recorded as a debt discount along with the remaining loan origination fee from the Loan and is being accreted over the term of the Term Loan. In addition, the Company is required to pay a fee of $525,000 upon certain change of control events.

The Term Loan may be prepaid in full at any time, provided that a prepayment fee is required to be paid by the Company upon prepayment. The prepayment fee ranges from 0.50% to 2.00% of the prepaid principal amount depending upon the date on which the prepayment is made. In connection with the Third Amendment, the Company guaranteed the obligations under the Loan Agreement and pledged substantially all of its assets as security under the Loan Agreement.

The Term Loan also includes covenants which includes the Company's submission of a clinical candidate for IND application made to the U.S. Food and Drug Administration by May 31, 2020 and have it accepted by June 30, 2020. This covenant has been satisfied.

Upon maturity or prepayment (as previously discussed), the Company will be required to pay a 2% fee as a result of the FDA's approval to proceed with the Company's the LUNAR-OTC (ARCT-810) program based on its IND submission. Such fee is accreted to the debt balance using the effective interest method over the term of the Loan Agreement.

Should an event of default occur, including the occurrence of a material adverse effect, the Company could be liable for immediate repayment of all obligations under the Loan Agreement. As of June 30, 2020, the Company was in compliance with all covenants under the Loan Agreement.

Principal payments, including the final payment due at repayment, on the long-term debt for fiscal years 2021, 2022 and 2023 are $1.3 million, $7.5 million and $6.7 million, respectively, with no principal payments due in 2020.

The Company recognized interest expense related to its long-term debt of $0.2 million and $0.5 million for the three and six months ended June 30, 2020, respectively, and $0.2 million and $0.4 million for the three and six months ended June 30, 2019, respectively.

Note 6. Stockholders' Equity

Restricted Common Shares

In March 2013, the founders of the Company purchased 2,783,686 shares of common stock for $0.0068 per share. Of the shares purchased, 1,538,353 were subject to a repurchase option whereby the Company has an option for two months after date of termination of service to repurchase any or all of the unvested shares at the original purchase price per share. The repurchase option shall be deemed to be automatically exercised by the Company as of the end of the two-month period unless the Company notifies the purchaser that it does not intend to exercise its option. The shares will be vested (1) 25% after obtaining suitable siRNA license; (2) 25% after *in vivo* proof-of-concept achieved; (3) 25% after a regulatory agency new drug application (such as an Investigational New Drug application) is filed and accepted by the applicable regulatory agency; and (4) 25% after human biological proof-of-concept is achieved. The Company met the first two milestones during 2013 and 2014 leaving an unvested balance of 769,176 shares. In 2017, the stock purchase agreements were amended to clarify vesting conditions and also to accelerate the vesting of 146,510 shares resulting in a modification expense of $1,495,000. As of June 30, 2019, there were 622,667 shares of common stock unvested and subject to the repurchase option. The Company met the third milestone during April 2020, and as of June 30, 2020, there were 311,333 shares of common stock currently unvested that are subject to the final repurchase option.

Net Loss per Share

Dilutive securities that were not included in the calculation of diluted net loss per share for the three and six months ended June 30, 2020 as they were anti-dilutive totaled 1,505,244 and 903,949, respectively, and 93,407 and 80,585 for the three and six months ended June 30, 2019, respectively.

For the three and six months ended June 30, 2020 and 2019, the calculation of the weighted-average number of shares outstanding excludes unvested restricted shares of common stock of 311,333.

Note 7. Share-Based Compensation

In June 2019, the Company adopted the 2019 Omnibus Equity Incentive Plan ("2019 Plan"), which was ratified by stockholders at the Company's 2019 annual meeting. Under the 2019 Plan, the Company is authorized to issue up to a maximum of 2,600,000 shares of common stock pursuant to the exercise of incentive stock options or other awards provided for therein. In June 2020, the stockholders of the Company approved an increase to the number of shares authorized for use in making awards under the 2019 Plan by 3,150,000 shares to 5,750,000. Accordingly, as of June 30, 2020, a total of 2,616,340 shares remain available for future issuance under the 2019 Plan.

In June 2020, the stockholders of the Company approved the 2020 Employee Stock Purchase Plan ("2020 Plan") which provides for 600,000 shares of Company common stock reserved for future issuance. The first accumulation period under the 2020 Plan will commence in August 2020.

Stock Options

Share-based compensation expenses included in the Company's condensed statements of operations and comprehensive loss for the three and six months ended June 30, 2020 and 2019 were:

	For the Three Months Ended June 30,		For the Six Months Ended June 30,	
(in thousands)	2020	2019	2020	2019
Research and development	$ 396	$ 157	$ 662	$ 308
General and administrative	705	246	1,288	494
Total	$ 1,101	$ 403	$ 1,950	$ 802

Note 8. Income Taxes

The Company is subject to taxation in the United States and various states. The Company computes its quarterly income tax provision by using a forecasted annual effective tax rate and adjusts for any discrete items arising during the quarter. The primary difference between the effective tax rate and the federal statutory tax rate relates to the valuation allowances on the Company's net operating losses. No tax benefit was provided for losses incurred in the United States because those losses are offset by a full valuation allowance.

For the three and six months ended June 30, 2020, the Company recorded income tax expense of $0 million. No tax benefit was provided for losses incurred in United States because those losses are offset by a full valuation allowance.

On March 27, 2020, the United States enacted the Coronavirus Aid, Relief and Economic Security Act (CARES Act). The Cares Act is an emergency economic stimulus package that includes spending and tax breaks to strengthen the United States economy and fund a nationwide effort to curtail the effect of COVID-19. While the CARES Act provides sweeping tax changes in response to the COVID-19 pandemic, some of the more significant provisions which are expected to impact the Company's financial statements include removal of certain limitations on utilization of net operating losses, increasing the loss carryback period for certain losses to five years, and increasing the ability to deduct interest expense, as well as amending certain provisions of the previously enacted Tax Cuts and Jobs Act. For the quarter ended March 31, 2020 the Company estimated that the impact of the CARES Act will be immaterial to its tax position. Due to the recent enactment of the CARES Act, the Company will continue to analyze the impact that the CARES Act will have in subsequent quarters on its financial position, results of operations or cash flows.

Note 9. Commitments and Contingencies

COVID-19 Vaccine Development

On March 4, 2020, the Company was awarded a grant (the "Grant") from the Singapore Economic Development Board to support the co-development of a potential COVID-19 vaccine with the Duke-NUS Medical School. The Grant provides for up to S$14.0 million (approximately US$10.0 million using the March 2, 2020 exchange rate) in grants to support the development of the vaccine. A portion of the Grant will be paid by the Economic Development Board in advance and the remainder of the Grant will be paid to the Company upon the achievement of certain milestones related to the progress of the development of the vaccine, as set forth in the award agreement. The funds received will be recognized as contra research and development expense in proportion to the percentage covered by the Economic Development Board of the overall budget. The Company is liable for certain expenses during the program. For the three and six months ended June 30, 2020, the Company recognized $3.8 million and $4.3 million of contra expense, respectively, with $0.7 million remaining in accrued expenses.

Cystic Fibrosis Foundation Agreement

On August 1, 2019, the Company amended its Development Program Letter Agreement, dated May 16, 2017 and as amended July 13, 2018, with the Cystic Fibrosis Foundation ("CFF"). Pursuant to the amendment, (i) CFF increased the amount it will award to advance LUNAR-CF to $15.0 million from approximately $3.2 million, (ii) the Company will provide $5.0 million in matching funds for remaining budgeted costs and (iii) the related disbursement schedule from CFF to Arcturus was modified such that (a) $4.0 million was disbursed upon execution of the CFF Amendment, (b) $2.0 million will be disbursed within 30 days of the first day of each of January, April, July and October 2020 upon Arcturus invoicing CFF to meet project goals, and (c) the last payment of $3.0 million less the prior award previously paid out, equaling approximately $2.3 million, will be disbursed upon Arcturus Therapeutics, Inc. invoicing CFF to meet good manufacturing practices and opening an Investigational New Drug ("IND") application. The funds received from CFF will be recognized as contra research and development expense in proportion to the percentage covered by CFF of the overall budget. For the three and six months ended June 30, 2020, the Company recognized $0.9 million and $2.9 million of contra expense, respectively, with $3.0 million remaining in accrued expenses. No contra research and development expense was recognized during the six months ended June 30, 2019.

Leases

In October 2017, the Company entered into a non-cancellable operating lease agreement for office space adjacent to its previously occupied headquarters. The commencement of the lease began in March 2018 and the lease extends for approximately 84 months from the commencement date with a remaining lease term through March 2025. Monthly rental payments are due under the lease and there are escalating rent payments during the term of the lease. The Company is also responsible for its proportional share of operating expenses of the building and common areas. In conjunction with the new lease, the Company received free rent for four months and received a tenant improvement allowance of $74,000. The lease may be extended for one five-year period at the then current market rate with annual escalations; however, the Company deemed the extension option not reasonably certain to be exercised and therefore excluded the option from the lease terms. The Company entered into an irrevocable standby letter of credit with the landlord for a security deposit of $96,000 upon executing the lease which is included (along with additional funds required to secure the letter of credit) in the balance of non-current restricted cash.

In February 2020, the Company entered into a non-cancellable operating lease agreement for office space near its current headquarters. The lease extends for 13 months from the commencement date. In conjunction with the new lease, the Company received free rent for one month. The lease may be extended for one twelve-month period; however, the Company deemed the extension option not reasonably certain to be exercised and therefore excluded the option from the lease terms.

Operating lease right-of-use asset and liability on the condensed consolidated balance sheets represent the present value of remaining lease payments over the remaining lease terms. The Company does not allocate lease payments to non-lease components; therefore, payments for common-area-maintenance and administrative services are not included in the operating lease right-of-use asset and liability. The Company uses its incremental borrowing rate to calculate the present value of the lease payments, as the implicit rate in the lease is not readily determinable.

As of June 30, 2020, the payments of the operating lease liability were as follows:

(in thousands)	Remaining Lease Payments
2020 (remaining)	$ 992
2021	1,427
2022	1,349
2023	1,390
2024	1,432
Thereafter	314
Total remaining lease payments	6,904
Less: imputed interest	(1,173)
Total operating lease liabilities	$ 5,731
Weighted-average remaining lease term	4.5 years
Weighted-average discount rate	8.4%

Operating lease costs consist of the fixed lease payments included in operating lease liability and are recorded on a straight-line basis over the lease terms. Operating lease costs were $0.5 million and $0.9 million for the three and six months ended June 30, 2020, respectively, and $0.3 million and $0.6 million for the three and six months ended June 30, 2019, respectively.

Note 10. Related Party Transactions

Ultragenyx

On June 17, 2019, Arcturus and Ultragenyx executed Amendment 3 to the Ultragenyx Agreement. Pursuant to the amended Ultragenyx Agreement, the Company also granted Ultragenyx a two-year option (the “Option”) to purchase up to 600,000 additional shares of common stock at a price of $16.00 per share (the “Additional Shares”). Ultragenyx exercised the Option in May 2020, and as a result, owns 14.6% of the outstanding common stock of the Company as of June 30, 2020. For the three and six months ended June 30, 2020, the Company has recognized revenue of $0.9 million and $1.8 million, respectively, and for the three and six months ended June 30, 2019, the Company recognized revenue of $2.5 million and $3.9 million, respectively. As of June 30, 2020 and 2019, the Company holds accounts receivable balances of negligible amounts.

Equity-Method Investment

In June 2018, the Company completed the sale of its intangible asset related to the ADAIR technology. Pursuant to the asset purchase agreement for ADAIR, the Company received a 30% ownership interest in the common stock of a privately held company in consideration for the sale of the ADAIR technology. The Company has no requirement to invest further in this private company. During the third quarter of 2019, the equity-method investee issued shares of its common stock at a share price greater than the initial investment which resulted in the Company recording a gain in its equity-method investment. The gain has been offset by additional losses incurred by the equity-method investee and calculated on a lag. For the three and six months ended June 30, 2020, the Company recorded losses of $0.1 million and $0.3 million, respectively. Subsequent to the equity-method investee issuing shares of its common stock, the Company’s ownership was reduced to 19%. As the Company continues to have the ability to exercise significant influence over the operating and financial policies of the investee, the Company will continue to account for the investment as an equity-method investment.

Note 11. Subsequent Events

Agreement with Israeli Ministry of Health

On July 23, 2020, the Company announced a binding term sheet with the Israeli Ministry of Health to supply the Company’s COVID-19 vaccine candidate, LUNAR-COV19. The parties intend to finalize a comprehensive supply agreement within 30 days of the announcement.

LUNAR-COV19 CTA acceptance

See discussion of the LUNAR-COV19 CTA acceptance at Note 1.

Underwritten Public Offering of Common Stock

See discussion of underwritten public offering of common stock and full exercise of the underwriters’ overallotment option at Note 1.

Chief Legal Officer

On August 6, 2020, the Company announced the appointment of Lance Kurata as Chief Legal Officer, effective August 10, 2020.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following is a discussion of the financial condition and results of operations of Arcturus Therapeutics Holdings Inc. for the three and six-month periods ended June 30, 2020. Unless otherwise specified herein, references to the "Company," "Arcturus," "we," "our" and "us" mean Arcturus Therapeutics Holdings Inc. and its consolidated subsidiaries from and after the effective time of the Redomiciliation and, prior to that time, to our predecessor, Arcturus Therapeutics Ltd. You should read the following discussion and analysis together with the interim condensed consolidated financial statements and related notes included elsewhere herein. For additional information relating to our management's discussion and analysis of financial conditions and results of operations, please see our Annual Report on Form 10-K for the year ended December 31, 2019 (the "2019 Annual Report"), which was filed with the U.S. Securities and Exchange Commission (the "Commission") on March 16, 2020. Unless otherwise defined herein, capitalized words and expressions used herein shall have the same meanings ascribed to them in the 2019 Annual Report.

This report includes forward-looking statements which, although based on assumptions that we consider reasonable, are subject to risks and uncertainties which could cause actual events or conditions to differ materially from those currently anticipated and expressed or implied by such forward-looking statements.

You should read this report and the documents that we reference in this report and have filed as exhibits to this report completely and with the understanding that our actual future results may be materially different from what we expect. You should also review the factors and risks we describe in the reports we will file or submit from time to time with the Commission after the date of this report. We qualify all of our forward-looking statements by these cautionary statements.

Overview

Arcturus is a messenger RNA medicines company focused on significant opportunities within liver and respiratory rare diseases, and the development of infectious disease vaccines utilizing our Self-Transcribing and Replicating RNA ("STARR") technology. In addition to our internal messenger RNA ("mRNA") platform, our proprietary lipid nanoparticle delivery system, LUNAR, has the potential to enable multiple nucleic acid medicines.

Our key proprietary technology has the potential to address the major hurdles in RNA development, namely the effective and safe delivery of RNA therapeutics to disease-relevant target tissues. We believe that the versatility of our platform to target multiple tissues, its compatibility with various nucleic acid therapeutics, and our expertise in developing scalable manufacturing processes put us in a good position to deliver on the next generation of nucleic medicines.

Our activities since inception have consisted principally of performing research and development activities, general and administrative activities and raising capital to fund those efforts. Our activities are subject to significant risks and uncertainties, including failing to secure additional funding before we achieve sustainable revenues and profit from operations. As of June 30, 2020, we had an accumulated deficit of $91.7 million.

Results of Operations

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our condensed consolidated financial statements and related notes appearing elsewhere in this Report and our audited financial statements and related notes for the year ended December 31, 2019. Our historical results of operations and the year-to-year comparisons of our results of operations that follow are not necessarily indicative of future results.

Collaboration Revenue

We enter into arrangements with pharmaceutical and biotechnology partners that may contain upfront payments, license fees for research and development arrangements, research and development funding, milestone payments, option exercise fees and royalties on future sales. The following table summarizes our total revenues for the periods indicated (in thousands):

	Three Months Ended June 30,		2019 to 2020	
(Dollars in thousands)	2020	2019	$ change	% change
Collaboration revenue	$ 2,322	$ 10,153	$ (7,831)	-77.1%

Collaboration revenue decreased by $7.8 million during the three months ended June 30, 2020 as compared to the three months ended June 30, 2019. The decrease in collaboration revenue relates to decreased revenue of $3.2 million from reimbursements from CureVac associated with the OTC collaboration that ended in the second quarter of 2019. The decrease also relates to decreased revenue of $3.1 million from sublicense revenue from Synthetic Genomics as we recognized a large payment in the second quarter of 2019. The remaining $1.5 million decrease was primarily due to a decrease in revenue recognition related to the Ultragenyx agreement as we recorded a large amount of upfront payment amortization upon the execution of the Ultragenyx Third Amendment during the second quarter of 2019.

	Six Months Ended June 30,		2019 to 2020	
(Dollars in thousands)	2020	2019	$ change	% change
Collaboration revenue	$ 4,968	$ 14,503	$ (9,535)	-65.7%

Collaboration revenue decreased by $9.5 million during the six months ended June 30, 2020 as compared to the six months ended June 30, 2019. The decrease in collaboration revenue primarily relates to decreased revenue of $4.8 million from reimbursements from CureVac associated with the OTC collaboration that ended in the second quarter of 2019. The decrease also relates to a $3.3 million decrease in sublicense revenue from Synthetic Genomics, as we recognized a large payment from Synthetic Genomics in the second quarter of 2019. The decrease also relates to a reduction of $2.0 million revenue recognized related to the Ultragenyx Agreement, as we recorded a large amount of upfront payment amortization upon the execution of the Ultragenyx Third Amendment during the second quarter of 2019 and also recognized fewer research and development expense reimbursements related to the Ultragenyx Agreement during the first half of 2020. The decrease was primarily offset by higher research and development expense reimbursements recognized in 2020 related to other collaboration agreements including Janssen and Takeda.

Our operating expenses consist of research and development and general and administrative expenses.

	Three Months Ended June 30,		2019 to 2020		Six Months Ended June 30,		2019 to 2020	
(Dollars in thousands)	2020	2019	$ change	% change	2020	2019	$ change	% change
Operating expenses:								
Research and development, net	$ 7,944	$ 7,269	$ 675	9.3%	$ 15,861	$ 14,593	$ 1,268	8.7%
General and administrative	4,420	3,456	964	27.9%	8,611	6,990	1,621	23.2%
Total	$ 12,364	$ 10,725	$ 1,639	15.3%	$ 24,472	$ 21,583	$ 2,889	13.4%

The following table presents our total research and development expenses by category:

	Three Months Ended June 30,		2019 to 2020		Six Months Ended June 30,		2019 to 2020	
(Dollars in thousands)	2020	2019	$ change	% change	2020	2019	$ change	% change
External pipeline development expenses:								
LUNAR-OTC (ARCT-810)	$ 1,182	$ 2,100	$ (918)	-43.7%	$ 4,874	$ 5,830	$ (956)	-16.4%
LUNAR-CF, net	968	260	708	*	1,304	451	853	*
LUNAR-COV19, net	2,428	—	2,428	*	2,559	—	2,559	*
Discovery technologies	(246)	1,331	(1,577)	*	235	1,929	(1,694)	-87.8%
External platform development expenses:								
Partnered discovery technologies	410	386	24	6.2%	780	691	89	12.9%
Total development expenses	4,742	4,077	665	16.3%	9,752	8,901	851	9.6%
Personnel related expenses, net	2,174	2,445	(271)	-11.1%	4,377	4,524	(147)	-3.2%
Facilities and equipment expenses	1,028	747	281	37.6%	1,732	1,168	564	48.3%
Total research and development expenses, net	$ 7,944	$ 7,269	$ 675	9.3%	$ 15,861	$ 14,593	$ 1,268	8.7%

* *Greater than 100%*

Research and Development Expenses, net

Our development expenses consist primarily of external manufacturing costs, in-vivo research studies performed by contract research organizations, clinical and regulatory consultants, and laboratory supplies related to conducting research and development activities.

The IND for our LUNAR-OTC (ARCT-810) program was accepted by the FDA in April 2020. During the first half of 2019, we began ramping up the LUNAR-OTC program in preparation for IND submission. As we initiated clinical trials early in the second quarter of 2020, the program costs have decreased by $0.9 million and $1.0 million for the three and six months ended June 30, 2020 as compared to 2019.

LUNAR-CF expenses increased by $0.7 million and $0.9 million during the three and six months ended June 30, 2020, respectively, as compared to 2019. The current year amount was partially offset with funds awarded by the Cystic Fibrosis Foundation (“CFF”). The increase in LUNAR-CF expenses during 2020 was due primarily to increased research and development cost incurred in association with the amendment to the CFF Agreement executed in July 2019, and we expect that our development efforts and associated costs will increase over the next year as the LUNAR-CF program moves toward expected IND submission in 2021.

In March 2020, we signed a contract for approximately $10.1 with Singapore Economic Development board that will fund a portion of the costs incurred in our LUNAR-COV19 program. We expect that the program costs will continue to increase as the clinical trial progresses. The program costs were $2.4 million and $2.6 million for the three and six months ended June 30, 2020, respectively. There were no comparable costs in 2019.

Discovery technologies represents our efforts to expand our product pipeline and are expected to continually increase over the near future. However, during the three and six months ended June 30, 2020 as compared to 2019, our discovery technologies costs decreased by $1.6 million and $1.7 million, respectively, as we focused our efforts on the advancement of our LUNAR-OTC (ARCT-810) and LUNAR-COV19 programs.

Within our platform development expenses, our partnered discovery expenses with our current partners are expected to fluctuate based on the needs of our collaboration partners. During the three and six months ended June 30, 2020 as compared to the prior period in 2019, partnered discovery expenses were relatively flat as a result of the stage of each program in which our collaboration partners are currently working.

Personnel related expenses for the three and six months ended June 30, 2020 decreased by $0.3 million and $0.1 million, respectively, as compared to 2019 due to more of our research and development expenses being funded by grant money this year. During the quarter ended June 30, 2020, personnel related expenses were offset by $0.3 million of funds received from CFF and $0.6 million of funds received from the Singapore Economic Development Board. We expect to continue to expand our headcount as required to meet our future business plan and expect personnel related expenses to increase going forward.

Facilities and equipment expenses increased by $0.3 million and $0.6 million during the three and six months ended June 30, 2020, respectively, as compared to 2019. The increase resulted primarily from higher rent and related costs associated with our second facility lease that we entered into in February 2020.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related benefits for our executive, administrative and accounting functions and professional service fees for legal and accounting services as well as other general and administrative expenses.

General and administrative expenses for the three and six months ended June 30, 2020 as compared to the three and six months ended June 30, 2019 increased by $1.0 million and $1.6 million, respectively. The increases resulted primarily from personnel expense due to increased headcount.

Finance expense, net

	Three Months Ended June 30,		2019 to 2020		Six Months Ended June 30,			
(Dollars in thousands)	2020	2019	$ change	% change	2020	2019	$ change	% change
Finance expense, net:								
Interest income	$ 74	$ 93	$ (19)	-20.4%	$ 177	$ 208	$ (31)	-14.9%
Interest expense	(195)	(206)	11	-5.3%	(450)	(409)	(41)	10.0%
Total	$ (121)	$ (113)	$ (8)	7.1%	$ (273)	$ (201)	$ (72)	35.8%

Interest income is generated on cash and cash equivalents and decreased for the three months ended June 30, 2020 as compared to the prior year period as a result of reduced investments as well as lower interest rates on investments. Interest expense was incurred in conjunction with our Loan and Security Agreement with Western Alliance Bank and increased for the six months ended June 30, 2020 as compared to 2019 as a result of a $5.0 million increase in our long-term debt balance. Interest expense for the three months ended June 30, 2020 remained relatively flat as compared to the prior year period as the aforementioned increase was offset by a reduced prime rate in the current period.

Off-balance sheet arrangements

Through June 30, 2020, we have not entered into and did not have any relationships with unconsolidated entities or financial collaborations, such as entities often referred to as structured finance or special purpose entities, established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes.

Contractual obligations

See Note 5 in our Condensed Consolidated Financial Statements for a summary of changes in the long-term debt position of the Company as of June 30, 2020.

As of June 30, 2020, we have non-cancelable contractual obligations totaling approximately $6.9 million.

Liquidity and Capital Resources

We are a clinical stage bioscience company that is dependent on obtaining external equity and debt financings to fund our operations. We expect to continue to incur losses and utilize significant cash resources until we successfully develop a new successful drug. Our ability to transition to become profitable in the near future is dependent on the success of our COVID-19 vaccine, and in later years mRNA drug or vaccine candidates for OTC deficiency, cystic fibrosis and other possible mRNA drugs or vaccine candidates that are currently in the initial phase of development.

Historically, our major sources of cash have been comprised of proceeds from collaboration partners, various public and private offerings of our common stock, bank debt, option and warrant exercises, and interest income. From inception through June 30, 2020, we raised approximately $288.6 million in gross proceeds from various public and private offerings of our common stock, debt issuances, collaboration agreements, and the merger with Alcobra.

As of June 30, 2020, we had approximately $136.2 million in cash, restricted cash and cash equivalents. Subsequently in July 2020, the Company raised, to date, additional capital of approximately $173.0 million through an underwritten public offering. In addition, the Company has borrowed $15.0 million through its facility with Western Alliance Bank.

Overview

The following table shows a summary of our cash flows for the six months ended June 30, 2020 and 2019 (in thousands):

	Six Months Ended June 30,	
(Dollars in thousands)	**2020**	**2019**
Cash provided by (used in):		
Operating activities	$ (20,352)	$ 3,929
Investing activities	(611)	(344)
Financing activities	85,721	15,546
Net increase in cash and restricted cash	$ 64,758	$ 19,131

Operating Activities

Our primary use of cash is to fund operating expenses, which consist mainly of research and development expenditures and general and administrative expenditures. We have incurred significant losses which have been partially offset by cash received through our collaboration agreements, equity offerings, debt financing and 2017 merger. Cash received under the collaboration agreements can vary from year to year depending on the terms of the agreements and work performed. These changes in cash flows primarily relate to the timing of cash receipts for upfront payments, reimbursable expenses and achievement of milestones under these collaborative agreements.

Net cash used in operating activities was $20.4 million on a net loss of $20.0 million for the six months ended June 30, 2020, compared to net cash provided of $3.9 million on a net loss of $7.6 million for the six months ended June 30, 2019. Adjustments for non-cash charges, including share-based compensation, depreciation and amortization, interest expense and loss from equity-method investment were $3.3 million and $1.9 million for the six months ended June 30, 2020 and 2019, respectively.

Changes in working capital resulted in adjustments to operating net cash outflows of $3.6 million for the six months ended June 30, 2020, and were driven by increases in accounts receivable and prepaid expenses as well as decreases in accounts payable and deferred revenue offset by an increase in accrued expenses. Changes in working capital resulted in adjustments to operating net cash inflows of $9.6 million for the six months ended June 30, 2019, and were driven by increases in deferred revenue and accounts payable offset by increases in accounts receivable and prepaid expenses as well as a decrease in accrued liabilities.

Investing Activities

Net cash used in investing activities of $0.6 million and $0.3 million for the six months ended June 30, 2020 and 2019, respectively, reflected cash used to purchase property and equipment

Financing Activities

Net cash provided by financing activities for the six months ended June 30, 2020 reflected proceeds of $9.6 million from the issuance of common stock to Ultragenyx upon exercise of their option, proceeds from the issuance of common stock of $75.3 million, and proceeds from the exercise of stock options of $0.8 million. Net cash provided by financing activities for the six months ended June 30, 2019 reflected proceeds from the issuance of common stock of $15.5 million.

Funding Requirements

We continue to incur significant expenses and will require additional capital to develop, test and manufacture our LUNAR-COV19 vaccine candidate and to continue clinical development of LUNAR-OTC; to advance our LUNAR-CF and LUNAR-CV preclinical programs into clinical development; to fund early research and development of novel and proprietary RNA medicines; and for general corporate and working capital purposes.

The Company intends to seek additional capital through equity and/or debt financings, collaborative or other funding arrangements with partners or through other sources of financing. Should we seek additional financing from outside sources, we may not be able to raise such financing on terms acceptable to us or at all. If we are unable to raise additional capital when required or on acceptable terms, we may be required to scale back or discontinue the advancement of product candidates, reduce headcount, liquidate our assets, file for bankruptcy, reorganize, merge with another entity, or cease operations.

Our future funding requirements are difficult to forecast and will depend on many factors, including the following:

- the achievement of milestones under our strategic alliance agreements;
- the terms and timing of any other strategic alliance, licensing and other arrangements that we may establish;
- the initiation, progress, timing and completion of preclinical studies and clinical trials for our product candidates;
- the number and characteristics of product candidates that we pursue;
- the outcome, timing and cost of regulatory approvals;
- delays that may be caused by changing regulatory requirements;
- the cost and timing of hiring new employees to support our continued growth;
- the costs involved in filing and prosecuting patent applications and enforcing and defending patent claims;
- the costs and timing of procuring clinical and commercial supplies of our product candidates;
- the costs and timing of establishing sales, marketing and distribution capabilities;
- the costs associated with legal proceedings; and
- the extent to which we acquire or invest in businesses, products or technologies.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

Our primary exposure to market risk is interest income and expense sensitivity and foreign currency exchange rates. Interest income and expense sensitivity is affected by changes in the general level of interest rates in the United States as well as foreign exchange market risks relate to the Grant from the Singapore Economic Development Board. When deemed appropriate, we may manage our exposure to foreign exchange market risks through the use of derivative financial instruments. We may utilize such derivative financial instruments for hedging or risk management purposes. Due to the nature of our cash and cash equivalents and our evaluation of the potential impact of foreign currency exchange rates, we believe that we are not currently subject to any material market risk exposure.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15(b) and Rule 15d-15(b) of the Exchange Act, our management, including our principal executive officer, our principal financial officer and our principal accounting officer, conducted an evaluation as of the end of the period covered by this Quarterly Report on Form 10-Q of the effectiveness of the design and operation of our disclosure controls and procedures. Based on that evaluation, management has concluded that as of June 30, 2020, the Company's disclosure controls and procedures were effective at the reasonable assurance level, and we believe that the condensed consolidated financial statements included in this Form 10-Q for the quarterly period ended June 30, 2020 fairly present, in all material respects, our financial position, results of operations, comprehensive loss, statements of stockholders' equity and cash flows for the periods presented in conformity with U.S. generally accepted accounting principles.

Changes in Internal Control over Financial Reporting

As required by Rule 13a-15(d) and Rule 15d-15(d) of the Exchange Act, our management, including our principal executive officer, our principal financial officer and our principal accounting officer, conducted an evaluation of the internal control over financial reporting to determine whether any other changes occurred during the period covered by this Quarterly Report on Form 10-Q that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Based on that evaluation, our principal executive officer, principal financial officer and principal accounting officer concluded that there were no changes in our internal controls over financial reporting during the period covered by this Quarterly Report on Form 10-Q that materially affected, or were reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

On December 13, 2019, a former employee of the Company filed a complaint in San Diego County Superior Court, captioned *Adonary Munoz v. Arcturus Therapeutics, Inc., et al*, Case No. 37-2019-00066358-CU-PO-CTL. The lawsuit alleges sexual assault by an acquaintance of one of our employees and seeks to hold the Company liable on a number of causes of action. On January 17, 2020, a second amended complaint ("SAC") was filed seeking $30.0 million in damages, including punitive damages and damages for emotional distress. The plaintiff has agreed to stipulate to arbitration for the claims being alleged against the Company. The Company believes the allegations of Ms. Munoz against the Company in her complaint are without merit, and intends to vigorously defend itself in the foregoing action. However, in light of the preliminary stage of the litigation, the Company is unable to estimate a potential loss or range of losses relating to this matter.

Item 1A. Risk Factors.

Our business is subject to various risks, including those described in Item 1A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2019, which we strongly encourage you to review. Other than as set forth below, there have been no material changes to the risk factors described in our Annual Report on Form 10-K for the year ended December 31, 2019 filed with the U.S. Securities and Exchange Commission ("SEC") on March 16, 2020.

Our pursuit of a COVID-19 vaccine candidate is at an early stage. We may be unable to produce a vaccine that successfully prevents infection from the virus in a timely manner, if at all, and preliminary data may not be indicative of future success.

In response to the global outbreak of coronavirus, in March 2020, we entered into a partnership with Duke-NUS Medical School in Singapore to develop a novel coronavirus (COVID-19) vaccine for Singapore. Our development of the vaccine is in early stages, and we may be unable to produce a vaccine that successfully prevents infection from the virus in a timely manner, if at all. We intend to commence a Phase 1/2 clinical trial in Singapore in August 2020, and in connection therewith, we will inject our LUNAR-COV19 vaccine candidate into human subjects for the first time, If any adverse events occur in the trial subjects, our development program could be delayed or halted altogether. We are also committing financial resources and personnel to the development of a COVID-19 vaccine which may cause delays in or otherwise negatively impact our other development programs, despite uncertainties surrounding the longevity and extent of coronavirus as a global health concern. Our business could be negatively impacted by our allocation of significant resources to a global health threat that is unpredictable and could rapidly dissipate or against which our vaccine, if developed, may not be partially or fully effective. In addition, a substantial number of companies, individuals and institutions are working to develop a vaccine, many of which have substantially greater financial, scientific and other resources than us, and another party may be successful in producing a more efficacious vaccine or other treatment for COVID-19 which may also lead to the diversion of governmental and quasi-governmental funding away from us and toward other companies, and lead to demand being driven away from our product, even if developed. Finally, even though we may report preliminary pre-clinical or other data that could appear to be positive, no assurance can be given that any product candidate will be safe in humans or prove to be effective once trials commence. We will not be able to commercialize or market the product candidate unless and until we are able to demonstrate that our vaccine candidate is safe and effective in humans.

It is possible that one or more government entities may take actions that directly or indirectly have a negative effect on our opportunities. If we were to develop a COVID-19 vaccine, the economic value of such a vaccine to us could be limited.

Various government entities, including the U.S. government, are offering incentives, grants and contracts to encourage additional investment by commercial organizations into preventative and therapeutic agents against coronavirus, which may have the effect of increasing the number of competitors and/or providing advantages to known competitors. Accordingly, there can be no assurance that we will be able to successfully establish a competitive market share for our COVID-19 vaccine, if any.

The recent coronavirus outbreak has caused interruptions or delays of our business plan and may have a significant adverse effect on our business.

In December 2019, a strain of coronavirus, COVID-19, was reported to have surfaced in Wuhan, China, and on March 12, 2020, the World Health Organization declared COVID-19 to be a pandemic. In an effort to contain and mitigate the spread of COVID-19, many countries, including the United States, Canada and China, have imposed unprecedented restrictions on travel, quarantines, and other public health safety measures. The extent to which the pandemic may impact our business will depend on future developments, which are highly uncertain and cannot be predicted, and the development of clinical supply materials could be delayed and enrollment of patients in our study for LUNAR-OTC and LUNAR-COV19 may be delayed or suspended, as hospitals and clinics in areas where we are conducting trials shift resources to cope with the COVID-19 pandemic and may limit access or close clinical facilities due to the COVID-19 pandemic. Additionally, if our trial participants are unable to travel to our clinical study sites as a result of quarantines or other restrictions resulting from the COVID-19 pandemic, we may experience higher drop-out rates or delays in our clinical studies.

Government-imposed quarantines and restrictions may also require us to temporarily terminate our clinical sites. Furthermore, if we determine that our trial participants may suffer from exposure to COVID-19 as a result of their participation in our clinical trials, we may voluntarily terminate certain clinical sites as a safety measure until we reasonably believe that the likelihood of exposure has subsided. As a result, our expected development timelines for our product candidates may be negatively impacted. We cannot predict the ultimate impact of the COVID-19 pandemic as consequences of such an event are highly uncertain and subject to change. We do not yet know the full extent of potential delays or impacts on our business, our clinical studies or as a whole; however, the COVID-19 outbreak may materially disrupt or delay our business operations, further divert the attention and efforts of the medical community to coping with COVID-19, disrupt the marketplace in which we operate, and/or have a material adverse effect on our operations.

Moreover, the various precautionary measures taken by many governmental authorities around the world in order to limit the spread of the coronavirus has had and may continue to have an adverse effect on the global markets and global economy generally, including on the availability and pricing of employees, resources, materials, manufacturing and delivery efforts and other aspects of the global economy. There have been business closures and a substantial reduction in economic activity in countries that have had significant outbreaks of COVID-19. Significant uncertainty remains as to the potential impact of the COVID-19 pandemic on the global economy as a whole. It is currently not possible to predict how long the pandemic will last or the time that it will take for economic activity to return to prior levels. The COVID-19 pandemic could materially disrupt our business and operations, interrupt our sources of supply, hamper our ability to raise additional funds or sell or securities, continue to slow down the overall economy or curtail consumer spending.

We are currently conducting foreign clinical trials ("FCTs") for our pending COVID-19 vaccine. While costs of FCTs may be significantly lower than the costs of an equivalent trial in the United States, there are risks associated with FCTs which may ultimately inhibit FDA approval.

Costs associated with FCTs may be significantly lower than the costs of equivalent trials in the United States. However, any clinical data from the FCT may not be adequate to support FDA approval without further preclinical studies, clinical trials, or both. Other companies have in the past encountered various problems with FCTs. The occurrence of any of these could have a material adverse effect on the ultimate path to FDA approval of any COVID-19 vaccine we may develop, which may negatively impact our financial condition and our business.

Currently we are only conducting FCTs for our pending COVID-19 vaccine and we have not yet submitted an investigational new drug application (IND) with the US FDA. We cannot market our pending COVID-19 vaccine in the United States unless and until we seek and obtain approval from the US FDA.

Currently, we are only conducting FCTs for LUNAR-COV19. We intend to prepare and submit to the FDA an IND for LUNAR-COV19. As such, we will be required to conduct further preclinical studies, clinical trials, or both in order to obtain approval to sell LUNAR-COV19 in the United States. If the FDA approves our IND for LUNAR-COV19, which cannot be assured, we would require significant additional financial resources to conduct clinical trials, which may not be available to us on attractive terms, if at all. Furthermore, no assurance can be given that such trials will demonstrate that LUNAR-COV19 is safe or effective. The inability to sell LUNAR-COV19 in the United States could have a material adverse effect on our financial condition and results of operations.

We are devoting significant resources to the scale-up and development of our LUNAR-COV19 vaccine candidate.

We are working toward the large scale technical development, manufacturing scale-up in several countries and larger scale deployment of this potential vaccine. The number of doses of this potential vaccine that we are able to produce is dependent on our ability, and the ability of our contract manufacturers, to successfully and rapidly scale-up manufacturing capacity. The number of doses that we will be able to produce is also dependent in large part on the dosage of the vaccine required to be administered to patients which will be determined in our clinical trials. To support the scale-up, we will need to expend significant resources and capital. Although we have previously raised capital to support our LUNAR-COV19 program, we will also need to seek and secure significant additional funding through a variety of potential contractual arrangements and collaborations with third parties. We may be unable to enter such arrangements on favorable terms, or at all, which would adversely affect our ability to develop, manufacture and distribute a potential vaccine.

There is also a risk that our ability to manufacture a sufficient supply of drug substance and drug product for our LUNAR-COV19 vaccine candidate will be adversely affected by shortages of critical raw material, due to increased demand in the market or other contingencies beyond our control as a result of the numerous other companies working to develop a vaccine for COVID-19.

In addition, since the path to licensure of any vaccine against COVID-19 is unclear, our LUNAR-COV19 vaccine candidate could be in wide circulation in certain countries prior to our receipt of marketing approval. Unexpected safety issues could lead to significant reputational damage for us and our technology platform going forward and other issues, including delays in our other programs, the need for re-design of our clinical trials and the need for significant additional financial resources. Given the rapidity of both the onset of the COVID-19 pandemic and our development efforts with respect to LUNAR-COV19, as well as the complexity of

the economics of a pandemic vaccine, we are only in the early stages of considering how to price a potential vaccine and cannot provide assurance as to the ultimate impact of our LUNAR-COV19 program on our company.

The regulatory pathway for LUNAR-COV19 is continually evolving, and may result in unexpected or unforeseen challenges.

To date, LUNAR-COV19 has moved rapidly through the regulatory review and approval process. The speed at which all parties are acting to create and test many therapeutics and vaccines for COVID-19 is unusual, and evolving or changing plans or priorities within the requisite regulatory bodies, including changes based on new knowledge of COVID-19 and how the disease affects the human body, may significantly affect the regulatory timeline for LUNAR-COV19. Results from clinical testing may raise new questions and require us to redesign proposed clinical trials, including revising proposed endpoints or adding new clinical trial sites or cohorts of subjects.

Our internal computer systems and physical premises, or those of our strategic collaborators or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs and our manufacturing operations.

Our internal computer systems and those of our current and any future strategic collaborators, vendors, and other contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, cybersecurity threats, war, and telecommunication and electrical failures. We may experience cyber-attacks on our information technology systems by threat actors of all types (including but not limited to nation states, organized crime, other criminal enterprises, individual actors and/or advanced persistent threat groups). In addition, we may experience intrusions on our physical premises by any of these threat actors. If any such cyber-attack or physical intrusion were to cause interruptions in our operations, such as a material disruption of our development programs or our manufacturing operations, whether due to a loss of our trade secrets or other proprietary information it would have a material and adverse effect on us. For example, the loss of clinical trial data from one or more ongoing or completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, if we were to run multiple clinical trials in parallel, any breach of our computer systems or physical premises could result in a loss of data or compromised data integrity across more than one of our programs in different stages of development. Any such breach, loss, or compromise of clinical trial participant personal data may also subject us to civil fines and penalties or claims for damages, either under the General Data Protection Regulation (“GDPR”) and relevant member state law in the EU, other foreign laws, and the federal Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), and other relevant state and federal privacy laws in the United States including the California Consumer Privacy Act (“CCPA”). On May 13, 2020, the Federal Bureau of Investigation (“FBI”) and Cybersecurity and Infrastructure Security Agency (“CISA”) announced that the FBI is investigating the targeting and compromise of U.S. organizations conducting COVID-19-related research by People’s Republic of China (“PRC”)-affiliated cyber actors. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, including but not limited to information related to our LUNAR-COV19 vaccine candidate, we could incur liability, our competitive and reputational position could be harmed, and the further development and commercialization of our investigational medicines could be delayed.

The positive data from the preclinical trials of LUNAR-COV19, our COVID-19 vaccine candidate, may not be predictive of the results of our planned clinical trials, which is one of a number of factors that may delay or prevent us from receiving regulatory approval of our COVID-19 vaccine candidate.

We have yet to conduct our first in-human clinical trials for LUNAR-COV19. Results from the proposed Phase 1/2 study or any interim results of any further Phase 2 or Phase 3 studies for LUNAR-COV19, if approved, could show diminished efficacy as compared to our preclinical study results. We also may observe adverse events in subjects participating in these clinical studies. In addition, the interpretation of the data from our clinical trials of LUNAR-COV19 by regulatory agencies may differ from our interpretation of such data and such regulatory agencies may require that we conduct additional studies or analyses. Further, the assays being used to measure and analyze the effectiveness of vaccines being developed to treat COVID-19 have only recently been developed and are continuing to evolve. The validity and standardization of these assays has not yet been established, and the results obtained in clinical studies of LUNAR-COV19 with subsequent versions of these assays may be less positive than the pre-clinical results we have obtained to date. Any of these factors and others that we may not be able to identify at this time, could delay or prevent us from receiving regulatory approval of LUNAR-COV19 and there can be no assurance that LUNAR-COV19 will be approved in a timely manner, if at all.

We are relying on advance purchase commitments of our LUNAR-COV19 vaccine candidate from certain foreign governmental agencies, including Singapore and the State of Israel.

Although we have previously raised capital to support the development and manufacture of our LUNAR-COV19 vaccine, we must also secure additional funding through contractual arrangements with third parties, including the governments of Singapore and the State of Israel. We may be unable to enter into such arrangements on favorable terms, or at all, which would adversely affect our ability to develop, manufacture and distribute a potential vaccine.

Our existing commitment from the State of Israel to purchase up to $275 million of the LUNAR-COV19 vaccine candidate is subject to the negotiation of a definitive supply agreement. We may not be able to agree on the terms and conditions of a definitive supply agreement, in which case, we may not receive any funds from the State of Israel.

We have a limited number of shares of common stock available for future issuance which could adversely affect our ability to raise capital or consummate acquisitions.

We are currently authorized to issue 30,000,000 shares of common stock under our Certificate of Incorporation. As of August 5, 2020, we have issued 24,388,176 shares of common stock and have approximately 5,440,738 shares of common stock committed for issuance giving effect to the assumed exercise of all outstanding warrants and options, resulting in approximately 171,086 authorized shares of common stock available for issuance.

Due to the limited number of authorized shares of common stock available for issuance, we may not be able to raise additional equity capital or complete a merger, other business combination or partnership unless we increase the number of shares we are authorized to issue. We would be required to seek stockholder approval to increase the number of our authorized shares of common stock. We can provide no assurance that we will succeed in amending our Certificate of Incorporation to increase the number of shares of common stock we are authorized to issue.

If we do not receive the requisite stockholder approval, our operations could be materially adversely impacted. In addition, an increase in the authorized number of shares of common stock and the subsequent issuance of such shares could have the effect of delaying or preventing a change in control of the Company without further action by our stockholders.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

None.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

None.

Item 6. Exhibits.

Exhibit No.	Description
3.1	Certificate of Incorporation of Arcturus Therapeutics Holdings Inc. Incorporated by reference to Exhibit 3.1 to the Company's Registration Statement on Form S-3, filed with the SEC on May 8, 2020 (File No. 333-238139).
3.2	Bylaws of Arcturus Therapeutics Holdings Inc. Incorporated by reference to Exhibit 3.2 to the Company's Registration Statement on Form S-3, filed with the SEC on May 8, 2020 (File No. 333-238139).
4.1	Agreement and Plan of Merger and Reorganization, by and between Alcobra Ltd., Aleph MergerSub, Inc. and Arcturus Therapeutics, Inc., dated as of September 27, 2017. Incorporated by reference to Exhibit 99.2 to the Company's Report of Foreign Private Issuer on Form 6-K filed on September 28, 2017 (File No. 001-35932).
4.2	2020 Employee Stock Purchase Plan. Incorporated by reference to Exhibit 4.3 to the Company's Registration Statement on Form S-8, filed with the SEC on August 5, 2020 (File No. 333-240392).
4.3†	Amended and Restated 2019 Omnibus Equity Incentive Plan. Incorporated by reference to Exhibit 4.3 to the Company's Registration Statement on Form S-8, filed with the SEC on August 5, 2020 (File No. 333-240397).
10.1†	Form of Indemnification Agreement. Incorporated by reference to Exhibit 10.1 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019 filed on March 16, 2020 (File No. 001-38942).
10.2	Underwriting Agreement, dated July 28, 2020, by and among Arcturus Therapeutics Holdings Inc., Citigroup Global Markets Inc., Guggenheim Securities, LLC, and Barclays Capital Inc. Incorporated by reference to Exhibit 1.1 to Form 8-K filed on July 29, 2020 (File No. 001-38942)
10.3†	Arcturus Therapeutics Ltd. Amended and Restated Compensation Policy for Company Office Holders. Incorporated by reference to Exhibit 99.2 to the Company's Report of Foreign Private Issuer on Form 6-K filed on July 27, 2018 (File No. 001-35932).
10.4	Loan and Security Agreement, dated October 12, 2018, by and between Western Alliance Bank and Arcturus Therapeutics, Inc. Incorporated by reference to Exhibit 10.1 to the Company's Report of Foreign Private Issuer on Form 6-K filed on October 15, 2018 (File No. 001-35932).
10.5	Amended and Restated Amendment to Development and Option Agreement, dated as of September 28, 2018, by and between CureVac AG and Arcturus Therapeutics Inc. Incorporated by reference to Exhibit 99.2 to the Company's Report of Foreign Private Issuer on Form 6-K filed on October 1, 2018 (File No. 001-35932).
10.6	Research Collaboration and License Agreement, by and between Arcturus Therapeutics, Inc. and Janssen Pharmaceuticals, Inc., dated October 18, 2017. Incorporated by reference to Exhibit 4.7 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.7	Research and Exclusive License Agreement, by and between Arcturus Therapeutics, Inc. and Synthetic Genomics, Inc., effective October 24, 2017. Incorporated by reference to Exhibit 4.8 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.8	Research Agreement, by and between Arcturus Therapeutics, Inc. and Millennium Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited, effective December 6, 2016, as amended December 21, 2017. Incorporated by reference to Exhibit 4.9 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.9	Research Collaboration and License Agreement, by and between Arcturus Therapeutics, Inc. and Ultragenyx Pharmaceutical Inc., entered into as of October 26, 2015, as amended October 17, 2017 and April 20, 2018. Incorporated by reference to Exhibit 4.10 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.10	Third Amendment to Research Collaboration and License Agreement, by and between Arcturus Therapeutics, Inc. and Ultragenyx Pharmaceutical Inc., effective June 18, 2019. Incorporated by reference to Exhibit 10.2 to Form 8-K filed on June 20, 2019 (File No. 001-38942).
10.11	Letter Agreement, by and between Arcturus Therapeutics, Inc. and the Cystic Fibrosis Foundation, dated May 16, 2017. Incorporated by reference to Exhibit 4.11 to Form 20-F filed on May 14, 2018 (File No. 001-35932).

10.12	Amendment No. 2 to Letter Agreement, by and between Arcturus Therapeutics, Inc. and the Cystic Fibrosis Foundation, dated August 1, 2019. Incorporated by reference to Exhibit 10.16 to Form 10-Q filed on August 14, 2019.
10.13	Development and Option Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated January 1, 2018, as amended May 3, 2018. Incorporated by reference to Exhibit 4.12 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.14	Third Amendment to Development and Option Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated July 26, 2019. Incorporated by reference to Exhibit 10.20 to Form 10-Q filed on August 14, 2019 (File No. 001-38942).
10.15	Co-Development and Co-Commercialization Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated January 1, 2018. Incorporated by reference to Exhibit 4.13 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.16	Termination Agreement, by and between Arcturus Therapeutics, Inc. and CureVac AG, dated July 26, 2019. Incorporated by reference to Exhibit 10.21 to Form 10-Q filed on August 14, 2019 (File No. 001-38942).
10.17	License Agreement, by and between Arcturus Therapeutics, Inc., as successor-in-interest to Marina Biotech, Inc., and Protiva Biotherapeutics Inc., dated as of November 28, 2012. Incorporated by reference to Exhibit 4.14 to Form 20-F/A filed on July 10, 2018 (File No. 001-35932).
10.18	Patent Assignment and License Agreement, by and between Arcturus Therapeutics, Inc. and Marina Biotech, Inc., dated as of August 9, 2013. Incorporated by reference to Exhibit 4.15 to Form 20-F filed with the SEC on May 14, 2018 (File No. 001-35932).
10.19	Share Exchange Agreement, dated as of February 11, 2019, by and between Arcturus Therapeutics Ltd. and Arcturus Therapeutics Holdings Inc. Incorporated by reference to Exhibit 10.13 to the Company's Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on March 18, 2019.
10.20	Amended and Restated Joint Venture, Research Collaboration and License Agreement, dated as of July 14, 2018 by and between Arcturus Therapeutics, Inc. and Providence Therapeutics, Inc. Incorporated by reference to Exhibit 10.14 to the Company's Amendment No. 1 to Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on April 10, 2019.
10.21	Research Collaboration Agreement, dated as of March 8, 2019 by and between Arcturus Therapeutics, Inc. and Millennium Pharmaceuticals, Inc., a wholly-owned subsidiary of Takeda Pharmaceutical Company Limited. Incorporated by reference to Exhibit 10.15 to the Company's Annual Report on Form 10-K for the year ended December 31, 2018 filed with the SEC on March 18, 2019.
10.22	Lease Agreement, by and between Arcturus Therapeutics, Inc. and ARE-SD Region No. 44, LLC, dated October 4, 2017. Incorporated by reference to Exhibit 4.6 to Form 20-F filed on May 14, 2018 (File No. 001-35932).
10.23	Lease Agreement, by and between Arcturus Therapeutics Holdings Inc. and ARE-SD Region No. 44, LLC dated February 1, 2020. Incorporated by reference to Exhibit 10.23 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019 filed on March 16, 2020 (File No. 001-38942).
10.24**	Acceptance Letter, dated March 4, 2020, between Arcturus Therapeutics Holdings Inc. and the Economic Development Board of Singapore. Incorporated by reference to Exhibit 10.24 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019 filed on March 16, 2020 (File No. 001-38942).
10.25	Sales Agreement, dated as of March 27, 2020, between the Company and Stifel, Nicolaus & Company, Incorporated. Incorporated by reference to Exhibit 10.1 to Form 8-K filed on March 27, 2020 (File No. 001-38942)
10.26	Underwriting Agreement dated April 16, 2020, by and between Arcturus Therapeutics Holdings Inc. and Guggenheim Securities, LLC. Incorporated by reference to Exhibit 1.1 to Form 8-K filed on April 17, 2020 (File No. 001-38942)
10.27†	Employment Agreement, dated as of June 13, 2019, between the Company and Joseph Payne. Incorporated by reference to Exhibit 10.1 to Form 8-K12B filed on June 14, 2019 (File No. 001-38942)
10.28†	Employment Agreement, dated as of June 13, 2019, between the Company and Andy Sassine. Incorporated by reference to Exhibit 10.2 to Form 8-K12B filed on June 14, 2019 (File No. 001-38942)
10.29†	Employment Agreement, dated as of June 13, 2019, between the Company and Dr. Padmanabh Chivukula. Incorporated by reference to Exhibit 10.3 to Form 8-K12B filed on June 14, 2019 (File No. 001-38942)

10.30	Registration Rights Agreement, dated as of June 18, 2019, between the Company and Ultragenyx Pharmaceutical Inc. Incorporated by reference to Exhibit 4.1 to Form 8-K filed on June 20, 2019 (File No. 001-38942).
10.31	Equity Purchase Agreement, dated as of June 18, 2019, between the Company and Ultragenyx Pharmaceutical Inc. Incorporated by reference to Exhibit 10.1 to Form 8-K filed on June 20, 2019 (File No. 001-38942).
31.1*	Certification by Principal Executive Officer pursuant to Rule 13a-14(a) or 15d-14(a) under the Securities Exchange Act of 1934, as amended.
31.2*	Certification by Principal Financial Officer pursuant to Rule 13a-14(a) or 15d-14(a) under the Securities Exchange Act of 1934, as amended.
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
	101.INS XBRL Instance Document
	101.SCH XBRL Taxonomy Extension Schema Document
	101.CAL XBRL Taxonomy Extension Calculation Linkbase Document
	101.DEF XBRL Taxonomy Extension Definition Linkbase Document
	101.LAB XBRL Taxonomy Extension Labels Linkbase Document
	101.PRE XBRL Taxonomy Extension Presentation Linkbase Document

* Filed herewith.

** Certain confidential portions of this exhibit have been redacted from the publicly filed document because such portions are (i) not material and (ii) would be competitively harmful if publicly disclosed.

† Management compensatory plan, contract or arrangement.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

ARCTURUS THERAPEUTICS HOLDINGS INC.

Date: August 10, 2020

By: /s/ Andrew Sassine
Andrew Sassine
Chief Financial Officer

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER

I, Joseph E. Payne, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Arcturus Therapeutics Holdings Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 10, 2020

By: /s/ Joseph E. Payne

Joseph E. Payne
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER

I, Andrew Sassine, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Arcturus Therapeutics Holdings Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 10, 2020

By: /s/ Andrew Sassine

Andrew Sassine
Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

The undersigned, the President and Chief Executive Officer of Arcturus Therapeutics Holdings Inc. (the "Company"), hereby certifies on the date hereof, pursuant to 18 U.S.C. 1350(a), as adopted pursuant to Section 906 of The Sarbanes-Oxley Act of 2002, that the Quarterly Report on Form 10-Q for the period ended June 30, 2020 (the "Form 10-Q"), filed concurrently herewith by the Company, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, and that the information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: August 10, 2020

By: /s/ Joseph E. Payne

Joseph E. Payne
President and Chief Executive Officer

Exhibit 32.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

The undersigned, the Chief Financial Officer of Arcturus Therapeutics Holdings Inc. (the "Company"), hereby certifies on the date hereof, pursuant to 18 U.S.C. 1350(a), as adopted pursuant to Section 906 of The Sarbanes-Oxley Act of 2002, that the Quarterly Report on Form 10-Q for the period ended June 30, 2020 (the "Form 10-Q"), filed concurrently herewith by the Company, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, and that the information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: August 10, 2020

By: /s/ Andrew Sassine

Andrew Sassine
Chief Financial Officer