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|-------------------------------------------------|-----------|
| <b>OMB APPROVAL</b>                             |           |
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Check this box if no longer subject to Section 16. Form 4 or Form 5 obligations may continue. See Instruction 1(b).

**STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP**

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934 or Section 30(h) of the Investment Company Act of 1940

|                                                                                                                                                                                                                  |                                                                                   |                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Name and Address of Reporting Person*<br><u>Davidson David</u><br><br>(Last) (First) (Middle)<br>C/O BLUEBIRD BIO, INC.<br>60 BINNEY STREET<br><br>(Street)<br>CAMBRIDGE MA 02142<br><br>(City) (State) (Zip) | 2. Issuer Name and Ticker or Trading Symbol<br><u>bluebird bio, Inc. [ BLUE ]</u> | 5. Relationship of Reporting Person(s) to Issuer<br>(Check all applicable)<br><br>Director 10% Owner<br><input checked="" type="checkbox"/> Officer (give title below) Other (specify below)<br><u>Chief Medical Officer</u> |
|                                                                                                                                                                                                                  | 3. Date of Earliest Transaction (Month/Day/Year)<br><u>08/01/2017</u>             |                                                                                                                                                                                                                              |
| 4. If Amendment, Date of Original Filed (Month/Day/Year)                                                                                                                                                         |                                                                                   |                                                                                                                                                                                                                              |

**Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned**

| 1. Title of Security (Instr. 3) | 2. Transaction Date (Month/Day/Year) | 2A. Deemed Execution Date, if any (Month/Day/Year) | 3. Transaction Code (Instr. 8) |   | 4. Securities Acquired (A) or Disposed Of (D) (Instr. 3, 4 and 5) |            |                          | 5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4) | 6. Ownership Form: Direct (D) or Indirect (I) (Instr. 4) | 7. Nature of Indirect Beneficial Ownership (Instr. 4) |
|---------------------------------|--------------------------------------|----------------------------------------------------|--------------------------------|---|-------------------------------------------------------------------|------------|--------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------|
|                                 |                                      |                                                    | Code                           | V | Amount                                                            | (A) or (D) | Price                    |                                                                                               |                                                          |                                                       |
| Common Stock                    | 08/01/2017                           |                                                    | M                              |   | 3,000                                                             | A          | \$2.09                   | 18,977                                                                                        | D                                                        |                                                       |
| Common Stock                    | 08/01/2017                           |                                                    | S <sup>(1)</sup>               |   | 1,800                                                             | D          | \$91.8407 <sup>(2)</sup> | 17,177                                                                                        | D                                                        |                                                       |
| Common Stock                    | 08/01/2017                           |                                                    | S <sup>(1)</sup>               |   | 1,100                                                             | D          | \$93.0318 <sup>(3)</sup> | 16,077                                                                                        | D                                                        |                                                       |
| Common Stock                    | 08/01/2017                           |                                                    | S <sup>(1)</sup>               |   | 100                                                               | D          | \$94.5125 <sup>(4)</sup> | 15,977                                                                                        | D                                                        |                                                       |

**Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)**

| 1. Title of Derivative Security (Instr. 3) | 2. Conversion or Exercise Price of Derivative Security | 3. Transaction Date (Month/Day/Year) | 3A. Deemed Execution Date, if any (Month/Day/Year) | 4. Transaction Code (Instr. 8) |   | 5. Number of Derivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4 and 5) |       | 6. Date Exercisable and Expiration Date (Month/Day/Year) |                 | 7. Title and Amount of Securities Underlying Derivative Security (Instr. 3 and 4) | 8. Price of Derivative Security (Instr. 5) | 9. Number of derivative Securities Beneficially Owned Following Reported Transaction(s) (Instr. 4) | 10. Ownership Form: Direct (D) or Indirect (I) (Instr. 4) | 11. Nature of Indirect Beneficial Ownership (Instr. 4) |       |
|--------------------------------------------|--------------------------------------------------------|--------------------------------------|----------------------------------------------------|--------------------------------|---|----------------------------------------------------------------------------------------|-------|----------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|-------|
|                                            |                                                        |                                      |                                                    | Code                           | V | (A)                                                                                    | (D)   | Date Exercisable                                         | Expiration Date |                                                                                   |                                            |                                                                                                    |                                                           |                                                        | Title |
| Stock Option (right to buy)                | \$2.09                                                 | 08/01/2017                           |                                                    | M                              |   |                                                                                        | 3,000 | (5)                                                      | 04/13/2022      | Common Stock                                                                      | 3,000                                      | \$0.00                                                                                             | 1,239                                                     | D                                                      |       |

**Explanation of Responses:**

- The sales reported in this Form 4 were effected pursuant to a Rule 10b5-1 trading plan adopted by the reporting person on December 12, 2016.
- The range of prices for the transaction reported on this line was \$91.60 to \$92.50. The average weighted price was \$91.8407. The reporting person will provide, upon request by the SEC, the issuer or a security holder of the issuer, full information regarding the number of shares sold at each separate price.
- The range of prices for the transaction reported on this line was \$93.00 to \$93.20. The average weighted price was \$93.0318. The reporting person will provide, upon request by the SEC, the issuer or a security holder of the issuer, full information regarding the number of shares sold at each separate price.
- The range of prices for the transaction reported on this line was \$94.50 to \$94.55. The average weighted price was \$94.5125. The reporting person will provide, upon request by the SEC, the issuer or a security holder of the issuer, full information regarding the number of shares sold at each separate price.
- This option vests over a four-year period, at a rate of twenty-five percent (25%) on February 13, 2013 and in 36 equal monthly installments thereafter.

**Remarks:**

/s/ Jason F. Cole, Attorney-in-Fact 08/03/2017

\*\* Signature of Reporting Person Date

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

\* If the form is filed by more than one reporting person, see Instruction 4 (b)(v).

\*\* Intentional misstatements or omissions of facts constitute Federal Criminal Violations See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, see Instruction 6 for procedure.

**Persons who respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB Number.**