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

SCHEDULE 14A

**Proxy Statement Pursuant to Section 14(a) of the
Securities Exchange Act of 1934
(Amendment No.)**

Filed by the Registrant

Filed by a party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material Pursuant to §240.14a-12

bluebird bio, Inc.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if Other Than The Registrant)

Payment of Filing Fee (Check the appropriate box):

- No fee required.
- Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.

(1) Title of each class of securities to which transaction applies:

(2) Aggregate number of securities to which transaction applies:

(3) Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (set forth the amount on which the filing fee is calculated and state how it was determined):

(4) Proposed maximum aggregate value of transaction:

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- Fee paid previously with preliminary materials.
- Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.

(1) Amount Previously Paid:

(2) Form, Schedule or Registration Statement No.:

(3) Filing Party:

(4) Date Filed:



April 24, 2014

Dear Stockholder:

You are cordially invited to attend the 2014 Annual Meeting of Stockholders of bluebird bio, Inc. The meeting will be held on June 11, 2014 at 9:00 a.m. EDT at the offices of Goodwin Procter LLP, located at 53 State Street, Boston, Massachusetts.

Details regarding admission to the meeting and the business to be conducted are more fully described in the accompanying Notice of Annual Meeting and Proxy Statement.

At this Annual Meeting, the agenda includes the election of two (2) Class I directors for three-year terms and the ratification of the appointment of Ernst & Young LLP as bluebird's independent registered public accounting firm for the fiscal year ending December 31, 2014.

Under Securities and Exchange Commission rules, the Company is providing access to the proxy materials for the Annual Meeting to shareholders via the Internet. Accordingly, you can access the proxy materials and vote at www.proxyvote.com. Instructions for accessing the proxy materials and voting are described below and in the Notice of Annual Meeting that you received in the mail. Your vote is very important. Whether or not you plan to attend the meeting, please carefully review the enclosed proxy statement and then cast your vote, regardless of the number of shares you hold. If you are a stockholder of record, you may vote over the Internet, by telephone, or, if you request to receive a printed set of the proxy materials, by completing, signing, dating and mailing the accompanying proxy card in the return envelope. Submitting your vote via the Internet or by telephone or proxy card will not affect your right to vote in person if you decide to attend the Annual Meeting. If your shares are held in street name (held for your account by a broker or other nominee), you will receive instructions from your broker or other nominee explaining how to vote your shares, and you will have the option to cast your vote by telephone or over the Internet if your voting instruction form from your broker or nominee includes instructions and a toll-free telephone number or Internet website to do so. In any event, to be sure that your vote will be received in time, please cast your vote by your choice of available means at your earliest convenience.

We hope that you will join us on June 11, 2014. Your continuing interest in bluebird is very much appreciated.

Sincerely,

A handwritten signature in black ink that reads "Nick Leschly".

Nick Leschly
President & Chief Executive Officer



NOTICE OF 2014 ANNUAL MEETING OF STOCKHOLDERS

- Time** 9:00 a.m., Eastern Time
- Date** Wednesday, June 11, 2014
- Place** The offices of Goodwin Procter LLP, located at 53 State Street, Boston, Massachusetts.
- Purpose** To elect Steven Gillis and Nick Leschly as Class I members of the Board of Directors, to serve until the Company's 2017 Annual Meeting of Stockholders and until their successors are duly elected and qualified;
To ratify the selection of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2014; and
To transact any other business that may properly come before the meeting or any adjournment thereof.
- Record Date** The Board of Directors has fixed the close of business on April 21, 2014 as the record date for determining stockholders entitled to notice of and to vote at the meeting.
- Meeting Admission** All stockholders as of the record date, or their duly appointed proxies, may attend the meeting. If you attend, you will be asked to present valid picture identification such as a driver's license or passport. If your bluebird stock is held in a brokerage account or by a bank or other nominee, you are considered the beneficial owner of shares held in street name, and this proxy statement is being forwarded to you by your broker or nominee. As a result, your name does not appear on our list of stockholders. If your stock is held in street name, in addition to picture identification, you should bring with you a letter or account statement showing that you were the beneficial owner of the stock on the record date, in order to be admitted to the meeting.
- Voting by Proxy** If you are a stockholder of record, please vote via the Internet or, for shares held in street name, please submit the voting instruction form you receive from your broker or nominee, as soon as possible so your shares can be voted at the meeting. You may submit your voting instruction form by mail. If you are a stockholder of record, you may also vote by telephone or by submitting a proxy card by mail. If your shares are held in street name, you will receive instructions from your broker or other nominee explaining how to vote your shares, and you may also have the choice of instructing the record holder as to the voting of your shares over the Internet or by telephone. Follow the instructions on the voting instruction form you received from your broker or nominee.

By order of the Board of Directors,

Jason F. Cole, Secretary

Cambridge, Massachusetts
April 24, 2014

Important Notice Regarding the Availability of Proxy Materials for the bluebird 2014 Annual Meeting of Stockholders to Be Held on June 11, 2014: The Notice of 2014 Annual Meeting of Stockholders, proxy statement and our Annual Report on Form 10-K for the fiscal year ended December 31, 2013, as amended, are available at www.bluebirdbio.com by following the link for "Investors and Media." To obtain directions to the offices of Goodwin Procter LLP in order to attend the annual meeting in person, please visit the "Investors – Calendar of Events" section of our website at www.bluebirdbio.com or contact Investor Relations at (339) 499-9300.

**BLUEBIRD BIO, INC.
150 SECOND STREET
THIRD FLOOR
CAMBRIDGE, MASSACHUSETTS 02141**

**PROXY STATEMENT
FOR THE 2014 ANNUAL MEETING OF STOCKHOLDERS
TO BE HELD ON JUNE 11, 2014
AT 9:00 AM EDT**

GENERAL INFORMATION

When are this proxy statement and the accompanying material scheduled to be sent to stockholders?

We have elected to provide access to our proxy materials to our stockholders via the Internet. Accordingly, on or about April 30, 2014, we will begin mailing a Notice of Internet Availability of Proxy Materials, or Notice of Internet Availability, and the proxy materials, including the Notice of 2014 Annual Meeting of Stockholders, this proxy statement and accompanying proxy card or, for shares held in street name (held for your account by a broker or other nominee), voting instruction form, and the Annual Report on Form 10-K for the year ending December 31, 2013 will be made available to stockholders on the Internet on the same date.

Why did I receive a Notice of Internet Availability of Proxy Materials instead of a full set of proxy materials?

Pursuant to rules adopted by the Securities and Exchange Commission, or SEC, we are providing access to our proxy materials over the Internet rather than printing and mailing the proxy materials. We believe electronic delivery will expedite the receipt of materials and will help lower our costs and reduce the environmental impact of our annual meeting materials. Therefore, a Notice of Internet Availability will be mailed to holders of record and beneficial owners of our common stock starting on or around April 30, 2014. The Notice of Internet Availability will provide instructions as to how stockholders may access and review the proxy materials, including the Notice of Annual Meeting, proxy statement, proxy card and Annual Report on Form 10-K, on the website referred to in the Notice of Internet Availability or, alternatively, how to request that a copy of the proxy materials, including a proxy card, be sent to them by mail. The Notice of Internet Availability will also provide voting instructions. In addition, stockholders of record may request to receive the proxy materials in printed form by mail or electronically by e-mail on an ongoing basis for future stockholder meetings. Please note that, while our proxy materials are available at the website referenced in the Notice of Internet Availability, and our Notice of Annual Meeting, proxy statement and Annual Report on Form 10-K are available on our website, no other information contained on either website is incorporated by reference in or considered to be a part of this document.

Who is soliciting my vote?

The Board of Directors of bluebird bio, Inc. (the "Company" or "bluebird") is soliciting your vote for the 2014 Annual Meeting of Stockholders.

When is the record date for the Annual Meeting?

The Company's Board of Directors has fixed the record date for the Annual Meeting as of the close of business on April 21, 2014.

How many votes can be cast by all stockholders?

A total of 24,364,335 shares of common stock of the Company were outstanding on April 21, 2014 and entitled to be voted at the meeting. Each share of common stock is entitled to one vote on each matter.

How do I vote?

If you are a stockholder of record and your shares are registered directly in your name, you may vote:

- **By Internet.** Access the website of the Company's tabulator, Broadridge, at: www.proxyvote.com, using the voter control number printed on the furnished proxy card. Your shares will be voted in accordance with your instructions. You must specify how you want your shares voted or your Internet vote cannot be completed and you will receive an error message. If you vote on the Internet, you may also request electronic delivery of future proxy materials.
- **By Telephone.** Call 1-800-690-6903 toll-free from the U.S., U.S. territories and Canada, and follow the instructions on the enclosed proxy card. Your shares will be voted in accordance with your instructions. You must specify how you want your shares voted or your telephone vote cannot be completed.
- **By Mail.** Complete and mail a proxy card in the enclosed postage prepaid envelope to Broadridge. Your proxy will be voted in accordance with your instructions. If you sign and return the enclosed proxy but do not specify how you want your shares voted, they will be voted **FOR** the nominees named herein to the Company's Board of Directors and **FOR** the ratification of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2014 and will be voted according to the discretion of the proxy holder upon any other business that may properly be brought before the meeting and at all adjournments and postponements thereof. If you are mailed or otherwise receive or obtain a proxy card or voting instruction form, and you choose to vote by telephone or by Internet, you do not have to return your proxy card or voting instruction form.
- **In Person at the Meeting.** If you attend the meeting, be sure to bring a form of personal picture identification with you, and you may deliver your completed proxy card in person, or you may vote by completing a ballot, which will be available at the meeting.

If your shares of common stock are held in street name (held for your account by a broker or other nominee):

- **By Internet or By Telephone.** You will receive instructions from your broker or other nominee if you are permitted to vote by Internet or telephone.
- **By Mail.** You will receive instructions from your broker or other nominee explaining how to vote your shares.
- **In Person at the Meeting.** If you attend the meeting, in addition to picture identification you should both bring an account statement or a letter from the record holder indicating that you owned the shares as of the record date, *and* contact the broker or other nominee who holds your shares to obtain a broker's proxy card and bring it with you to the meeting.

What are the Board's recommendations on how to vote my shares?

The Board of Directors recommends a vote:

Proposal 1: FOR election of the two Class I directors (page 5)

Proposal 2: FOR ratification of the selection of Ernst & Young LLP as the Company's independent registered public accounting firm (page 31)

Who pays the cost for soliciting proxies?

bluebird will pay the cost for the solicitation of proxies by the Board of Directors. The solicitation of proxies will be made primarily by mail and through internet access to materials. Proxies may also be solicited

personally, by telephone, fax or e-mail by employees of bluebird without any remuneration to such individuals other than their regular compensation. bluebird will also reimburse brokers, banks, custodians, other nominees and fiduciaries for forwarding these materials to their principals to obtain the authorization for the execution of proxies.

Can I change my vote?

You may revoke your proxy at any time before it is voted by notifying the Secretary in writing, by returning a signed proxy with a later date, by transmitting a subsequent vote over the Internet or by telephone prior to the close of the Internet voting facility or the telephone voting facility, or by attending the meeting and voting in person. If your stock is held in street name, you must contact your broker or nominee for instructions as to how to change your vote.

What vote is required to approve each item?

The two nominees for election as Class I directors who receive a plurality of the votes cast for election of directors shall be elected directors (Proposal 1). A majority of votes cast is necessary for ratification of the selection of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2014 (Proposal 2).

If there are insufficient votes to approve Proposal 2, your proxy may be voted by the persons named in the proxy to adjourn the Annual Meeting in order to solicit additional proxies in favor of the approval of such proposal. If the Annual Meeting is adjourned or postponed for any purpose, at any subsequent reconvening of the meeting, your proxy will be voted in the same manner as it would have been voted at the original convening of the Annual Meeting unless you withdraw or revoke your proxy. Your proxy may be voted in this manner even though it may have been voted on the same or any other matter at a previous session of the Annual Meeting.

How is a quorum reached?

The presence, in person or by proxy, of holders of at least a majority of the total number of outstanding shares entitled to vote is necessary to constitute a quorum for the transaction of business at the Annual Meeting. Shares held of record by stockholders or brokers, bankers or other nominees who do not return a signed and dated proxy or attend the Annual Meeting in person will not be considered present or represented at the Annual Meeting and will not be counted in determining the presence of a quorum. Abstentions and "broker non-votes" (i.e., shares represented at the meeting held by brokers, bankers or other nominees as to which instructions have not been received from the beneficial owners or persons entitled to vote such shares and, with respect to one or more (but not all) issues), if any, will be counted for purposes of determining whether a quorum is present for the transaction of business at the meeting.

How is the vote counted?

Votes cast by proxy or in person at the Annual Meeting will be counted by the persons appointed by bluebird to act as tabulators for the meeting. The tabulators will count all votes "for," "against," to "withhold," frequency and abstentions and broker non-votes (i.e., where a broker has not received voting instructions from the beneficial owner and for which the broker does not have discretionary power to vote on a particular matter), as applicable, for each matter to be voted on at the Annual Meeting. Shares represented by proxies that withhold authority to vote for a nominee for election as a director will not be counted as votes "for" a director. Shares properly voted to "abstain" on a particular matter and broker non-votes are treated as having not voted on the particular matter and will therefore not affect the outcome of Proposal 2.

Under the rules that govern brokers holding shares for their customers, brokers who do not receive voting instructions from their customers have the discretion to vote uninstructed shares on routine matters, but do not

have discretion to vote such uninstructed shares on non-routine matters. Only Proposal 2, the ratification of the selection of Ernst & Young LLP, is considered a routine matter where brokers are permitted to vote shares held by them without instruction. If your shares are held through a broker, those shares will not be voted in the election of directors unless you affirmatively provide the broker instructions on how to vote.

Could other matters be decided at the Annual Meeting?

bluebird does not know of any other matters that may be presented for action at the Annual Meeting. Should any other business come before the meeting, the persons named on the enclosed proxy will have discretionary authority to vote the shares represented by such proxies in accordance with their best judgment. If you hold shares through a broker, bank or other nominee as described above, they will not be able to vote your shares on any other business that comes before the Annual Meeting unless they receive instructions from you with respect to such matter.

What happens if the meeting is postponed or adjourned?

Your proxy may be voted at the postponed or adjourned meeting. You will still be able to change your proxy until it is voted.

How can I find out the results of the voting at the Annual Meeting?

Preliminary voting results will be announced at the annual meeting. Final voting results will be published in a Current Report on Form 8-K, or Form 8-K, that we expect to file with the SEC within four business days after the annual meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the annual meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

What does it mean if I receive more than one proxy card or voting instruction form?

It means that you have multiple accounts at the transfer agent or with brokers. Please complete and return all proxy cards or voting instruction forms to ensure that all of your shares are voted.

Implications of being an “emerging growth company”.

We are an “emerging growth company” as that term is used in the Jumpstart Our Business Startups (JOBS) Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements. These reduced reporting requirements include reduced disclosure about the company’s executive compensation arrangements and no non-binding advisory votes on executive compensation. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of our initial public offering on June 24, 2013, (b) in which we have total annual gross revenue of at least \$1.0 billion, or (c) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds \$700 million as of the prior June 30th, and (2) the date on which we have issued more than \$1.0 billion in non-convertible debt during the prior three-year period.

Who should I call if I have any additional questions?

If you hold your shares directly, please call Jason F. Cole, Secretary of the Company, at (339) 499-9300. If your shares are held in street name, please contact the telephone number provided on your voting instruction form or contact your broker or nominee holder directly.

PROPOSAL 1: ELECTION OF DIRECTORS

In accordance with Delaware law and the Company's certificate of incorporation and By-laws, the Board of Directors is divided into three classes of approximately equal size. The members of each class are elected to serve a three-year term with the term of office of each class ending in successive years. Steven Gillis and Nick Leschly are the directors whose terms expire at this Annual Meeting and each of Dr. Gillis and Mr. Leschly has been nominated for and has agreed to stand for re-election to the Board of Directors to serve as a Class I director of the Company until the 2017 Annual Meeting and until his successor is duly elected. Pursuant to the By-laws, the Board of Directors has fixed the number of directors at eight (8) as of the date of this year's Annual Meeting of Stockholders.

It is intended that, unless you give contrary instructions, shares represented by proxies solicited by the Board of Directors will be voted for the election of the two nominees listed below as director nominees. The vote of a plurality of the votes cast at the meeting will be required for the election of the Class I director nominees. Broker non-votes and votes withheld will not be treated as votes cast for this purpose and, therefore, will not affect the outcome of the election. bluebird has no reason to believe that any nominee will be unavailable for election at the Annual Meeting. In the event that one or more nominees is unexpectedly not available to serve, proxies may be voted for another person nominated as a substitute by the Board of Directors, or the Board of Directors may reduce the number of directors to be elected at the Annual Meeting. Information relating to each nominee for election as director and for each continuing director, including his or her period of service as a director of bluebird, principal occupation and other biographical material is shown below.

**THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE
FOR
EACH OF THESE NOMINEES FOR CLASS I DIRECTOR
(PROPOSAL 1 ON YOUR PROXY CARD)**

DIRECTOR BIOGRAPHIES

The following table sets forth information concerning our directors as of April 21, 2014. The biographical description of each director includes the specific experience, qualifications, attributes and skills that the Board of Directors would expect to consider if it were making a conclusion currently as to whether such person should serve as a director.

CLASS I DIRECTOR NOMINEES

	<u>AGE</u>	<u>DIRECTOR SINCE</u>
<p><i>Steven Gillis, Ph.D.</i> – Dr. Gillis is a Class I director who has served as a member of our board of directors since April 2011. Since 2005, Dr. Gillis has been a managing director at ARCH Venture Partners, a venture capital firm. From 1994 to 2005, Dr. Gillis served as chief executive officer and chairman of the board of directors of Corixa Corporation, which he co-founded in October 1994. Previously, Dr. Gillis served as a director, head of research and development, chief scientific officer and acting chief executive officer of Immunex Corporation, which he co-founded. As a former director and chairman of Trubion Pharmaceuticals, Inc., Dr. Gillis led its acquisition by Emergent BioSolutions in the fall of 2010. Dr. Gillis currently serves as a director of Shire plc, Accelerator Corporation, Acylin Therapeutics Corp., Allozyne, Inc., Oncofactor Corp., Pulmatrix, Inc. and VBI Vaccines and serves as director and chairman of VentiRX Pharmaceuticals, Inc., Theraclone Sciences, Inc., Lycera Corp. and PhaseRx, Inc. Dr. Gillis received his B.A. in biology and English from Williams College and his Ph.D. in biological science from Dartmouth College. We believe that Dr. Gillis’s experience in the venture capital industry, particularly with biotech and pharmaceutical companies, combined with his experience in molecular and tumor immunology, qualify him to serve as a member of our board of directors.</p>	60	April 2011
<p><i>Nick Leschly</i> – Mr. Leschly is a Class I director who has served as our president and chief executive officer since September 2010. Previously, he served as our interim chief executive officer from March 2010 to September 2010. Formerly a partner of Third Rock Ventures, L.P. since its founding in 2007, Mr. Leschly played an integral role in the overall formation, development and business strategy of several of Third Rock’s portfolio companies, including Agios Pharmaceuticals, Inc. and Edimer Pharmaceuticals, Inc. Prior to joining Third Rock, he worked at Millennium Pharmaceuticals, Inc., leading several early-stage drug development programs and served as the product and alliance leader for VELCADE. Mr. Leschly also founded and served as chief executive officer of MedXtend Corporation. He received his B.S. in molecular biology from Princeton University and his M.B.A. from Wharton Business School. We believe that Mr. Leschly’s operation and historical experience with our Company gained from serving as our president, chief executive officer and member of the board of directors, combined with his experience in the venture capital industry and drug research and development qualify him to serve as a member of our board of directors.</p>	41	March 2010
<p><u>CURRENT DIRECTORS NOT STANDING FOR ELECTION AT THE ANNUAL MEETING</u></p> <p><i>Wendy L. Dixon, Ph.D.</i> – Dr. Dixon is a Class III director who has served as a member of our board of directors since April 2013. In 2012, Dr. Dixon was a principal at Great Meadow Consulting LLC and in 2010, she served as senior advisor at The Monitor Group. Since 2005, Dr. Dixon has advised and consulted and in some instances served as a member of the board of director for a number of biopharmaceutical companies, including Alkermes PLC, Incyte Corporation, Orexigen Therapeutics, Edimer Pharmaceuticals Inc., Furiex Pharmaceuticals, and formerly on Ardea Biosciences, Inc. (sold to AstraZeneca PLC in 2012) and Dentsply International. Dr. Dixon also</p>	58	April 2013

**CURRENT DIRECTORS NOT STANDING FOR
ELECTION AT THE ANNUAL MEETING**

served as Chief Marketing Officer and President of Global Marketing for Bristol-Myers Squibb and as a member of the CEO's Executive Committee from 2001 to 2009. She has had an over 30-year career in the pharmaceutical and biotechnology business, combining a technical background and experience in drug development and regulatory affairs with commercial responsibilities in building and leading organizations and launching and growing more than 20 pharmaceutical products including Tagamet, Fosamax, Singulair, Plavix, Abilify, Reyataz and Baraclude. From 1996 to 2001, she was Senior Vice President Marketing at Merck and prior to that she held executive management positions at West Pharmaceuticals, Osteotech and Centocor, and various positions at SmithKline and French (now GlaxoSmithKline) in marketing, regulatory affairs, project management and as a biochemist. Dr. Dixon received her B.Sc., M.Sc. and Ph.D. from the University of Cambridge (UK). We believe that, among other experience, qualifications, attributes and skills, Dr. Dixon's technical background in drug development, commercialization, marketing and regulatory affairs qualify her to serve as a member of our board of directors.

AGE

DIRECTOR SINCE

Daniel S. Lynch – Mr. Lynch is a Class II director who has served as chairman of our board of directors since May 2011, when he joined Third Rock Ventures, L.P., or Third Rock, as an entrepreneur-in-residence. Since October 2007, Mr. Lynch has advised and served as executive chair or member of the board of directors for a number of private biopharmaceutical companies, which include Stromedix, Inc. (until its acquisition by Biogen Idec in February 2012), Avila Therapeutics, Inc. (until its acquisition by Celgene Corporation in February 2012), BIND Biosciences, Inc., Eleven Biotherapeutics, Inc., RaNA Therapeutics, Inc., Nimbus Discovery, LLC, Edimer Pharmaceuticals, Ember Therapeutics, Inc. and Blueprint Medicines, Inc. Previously, Mr. Lynch served as chief executive and chief financial officer of ImClone Systems Corporation, or ImClone. As ImClone's chief executive officer, he led ImClone through a significant turnaround, helping to restore the company's reputation and to secure FDA approval of ERBITUX (Cetuximab), a novel cancer treatment. As its chief financial officer, Mr. Lynch led negotiations to form the major partnership between ImClone and Bristol-Myers Squibb. Earlier in his career, he served in various financial positions at Bristol-Myers Squibb over a 15-year tenure. He served on the board of directors and the audit committee of U.S. Oncology, Inc. for five years until December 2010, when it was acquired by McKesson. Mr. Lynch received his B.A. in mathematics from Wesleyan University and his M.B.A. from the Darden Graduate School of Business Administration at the University of Virginia. We believe that Mr. Lynch's experience as chief executive officer and chief financial officer of a public pharmaceutical company and as executive chairman and director for many other life science companies, qualify him to serve as a member of our board of directors.

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May 2011

James Mandell, M.D. – Dr. Mandell is a Class III director who has served as a member of our board of directors since January 2014. Dr. Mandell became Chief Executive Officer of Boston Children's Hospital and Children's Medical Center on October 1, 2000, retiring from the position in October 2013. During his tenure, Dr. Mandell was a member of the Board of Trustees and Professor of Surgery at Harvard Medical School. Prior to joining Children's Hospital, he served as Dean of Albany Medical College and Professor of Surgery and Pediatrics. Dr. Mandell was promoted from Chief of Urology to Dean of Albany Medical College in 1996. He also served as Executive Vice President for Health Affairs at Albany Medical Center and Executive Medical Director of Albany Medical Center Hospital. Prior to his tenure at Albany Medical College, he was a member of the medical staff at Children's Hospital

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January 2014

**CURRENT DIRECTORS NOT STANDING FOR
ELECTION AT THE ANNUAL MEETING**

	<u>AGE</u>	<u>DIRECTOR SINCE</u>
<p>for nine years, advancing to an associate in Surgery with an associate professor appointment at Harvard Medical School. Dr. Mandell serves on the Board of the Franciscan’s Hospital for Children and as Chair of the Board of the Harvard Risk Management Company. In addition to a medical degree from the University of Florida College of Medicine, Dr. Mandell holds a Master’s in Health Systems Management from Union College, New York. We believe that, among other experience, qualifications, attributes and skills, Dr. Mandell’s background as a physician focused on pediatric diseases, and experience as the chief executive officer of a major hospital and medical center, including interactions with payers, qualifies him to serve as a member of our board of directors.</p>		
<p><i>John M. Maraganore, Ph.D.</i> – Dr. Maraganore is a Class II director who has served as a member of our board of directors since January 2012. Since December 2002, Dr. Maraganore has served as the chief executive officer and as a director of Alnylam Pharmaceuticals, Inc. From December 2002 to December 2007, Dr. Maraganore served as president of Alnylam. From April 2000 to December 2002, Dr. Maraganore served as senior vice president, strategic product development with Millennium Pharmaceuticals, Inc. Before Millennium, he served as director of molecular biology and director of market and business development at Biogen, Inc. (now Biogen Idec, Inc.). Prior to Biogen, Dr. Maraganore was a scientist at ZymoGenetics, Inc., and The Upjohn Company. Dr. Maraganore is also a director for Agios Pharmaceuticals, Regulus Therapeutics, Inc. and Tempero Pharmaceuticals. In addition, he is an advisor to Third Rock Ventures, L.P. He is also a member of the Immunology Advisory Council of Harvard Medical School and a member of the Biotechnology Industry Organization Board. Dr. Maraganore holds a B.A. in biological sciences from the University of Chicago and an M.S. and a Ph.D. in biochemistry and molecular biology from the University of Chicago. We believe that Dr. Maraganore’s experience as chief executive officer and president of a public pharmaceutical company and as a board member of other public pharmaceutical companies qualify him to serve as a member of our board of directors.</p>	51	January 2012
<p><i>David P. Schenkein, M.D.</i> – Dr. Schenkein is a Class III director who has served as a member of our board of directors since April 2013. Since August 2009, Dr. Schenkein has served as the chief executive officer of Agios Pharmaceuticals. From April 2006 to July 2009, Dr. Schenkein served as senior vice president of oncology development of Genentech. Dr. Schenkein is also a director for Agios Pharmaceuticals, Foundation Medicine, Inc. and Blueprint Medicine, Inc. Dr. Schenkein received his B.A. in chemistry from Wesleyan University and his M.D. from Upstate Medical School. We believe that Dr. Schenkein’s experience as chief executive officer of Agios Pharmaceuticals and his membership on the board of directors of a number of biopharmaceutical companies qualify him to serve as a member of our board of directors.</p>	56	April 2013
<p><i>Robert I. Tepper, M.D.</i> – Dr. Tepper is a Class II director who has served as a member of our board of directors since September 2010. Dr. Tepper is a distinguished scientist with over 25 years of experience building and operating leading R&D operations. Dr. Tepper co-founded Third Rock Ventures, L.P. in March 2007 and focuses on the formation, development and scientific strategy of Third Rock’s portfolio companies, as well as actively identifying and evaluating new investments. He also assumes active leadership roles in Third Rock’s portfolio companies, functioning as chief scientific officer through the first 12-18 months post launch. Prior to joining Third Rock</p>	58	September 2010

**CURRENT DIRECTORS NOT STANDING FOR
ELECTION AT THE ANNUAL MEETING**

AGE

DIRECTOR SINCE

Ventures, L.P., Dr. Tepper served as president of research and development Millennium Pharmaceuticals from 2003 to 2007 and was vital in its expansion from a drug discovery company to a fully integrated biopharmaceutical company. Before joining Millennium in 1994, he served as principal investigator in the laboratory of tumor biology at Massachusetts General Hospital Cancer Center. Dr. Tepper is also a founder and former member of the scientific advisory board of Cell Genesys/Abgenix. Dr. Tepper holds an A.B. in biochemistry from Princeton University and an M.D. from Harvard Medical School. Dr. Tepper serves as an adjunct faculty member at Harvard Medical School and Massachusetts General Hospital and is an advisory board member of several leading healthcare institutions, including the Partners HealthCare Center for Personalized Genetic Medicine, Harvard Medical School and Tufts Medical School. Dr. Tepper is a board member of Alcresta, Allena Pharmaceuticals, Inc., Cerulean Pharma Inc., Constellation Pharmaceuticals Inc., Kala Pharmaceuticals, Inc. and Jounce Therapeutics, Inc. and is also on the board of overseers at Tufts University. We believe that Dr. Tepper's experience in the venture capital industry, particularly with biotech and pharmaceutical companies, combined with his experience building and operating research and development operations and as faculty and advisory board members of several healthcare institutions, qualify him to serve as a member of our board of directors.

EXECUTIVE OFFICERS

The following table sets forth information regarding our executive officers, as of April 21, 2014:

<u>Name</u>	<u>Age</u>	<u>Position(s)</u>
Executive Officers:		
Nick Leschly(1)	41	President, Chief Executive Officer and Director
Jeffrey T. Walsh	48	Chief Operating Officer and Treasurer (Principal Financial Officer)
Mitchell H. Finer, Ph.D.	55	Chief Scientific Officer
David Davidson, M.D.	50	Chief Medical Officer
Jason F. Cole, Esq.	41	Senior Vice President, General Counsel and Secretary
Eric Sullivan	34	Senior Director, Finance (Principal Accounting Officer)

(1) Nick Leschly is also a director of the Company and his biographical information appears on page 6.

Jeffrey T. Walsh—Mr. Walsh has served as our chief operating officer since May 2011 and as our treasurer since March 2014. Mr. Walsh has over 25 years of experience in executive leadership positions with responsibility for finance, business development, commercial and business operations, strategic planning and legal functions with established and emerging public and private life sciences companies. From November 2008 to February 2011, Mr. Walsh served as chief business officer of Taligen Therapeutics, Inc. where he played a key role in the growth of the company and the ultimate sale of Taligen Therapeutics, Inc. to Alexion Pharmaceuticals, Inc. in January 2011. Mr. Walsh started his career at SmithKline Beecham Corporation in finance and worldwide business development roles. He subsequently held senior business development, finance and operations roles at PathoGenesis Corp. (acquired by Chiron Corporation), Allscripts Healthcare Solutions Inc., EXACT Sciences Corporation and Inotek Pharmaceuticals Corp. Mr. Walsh received his B.A. in sociology and economics from Yale University and his M.B.A. from the Kellogg Graduate School of Management at Northwestern University.

Mitchell H. Finer, Ph.D.—Dr. Finer has served as our chief scientific officer since March 2010. Prior to joining us, Dr. Finer served as senior vice president of development and operations for Novocell, Inc. (now ViaCyte, Inc.), a stem cell engineering company researching treatments for diabetes and other chronic diseases from November 2008 through March 2010. From July 2005 through November 2008, Dr. Finer served as chief executive officer of Intracel Holdings LLC. From June 2003 to June 2005, he held the position of president and chief executive officer of Genteric Inc., or Genteric, which filed a voluntary petition for reorganization under Chapter 11 of the U.S. bankruptcy code in August 2004. Previously, he had served as Genteric's chief scientific officer from November 2002 to June 2003 and as vice president of research and development for the Gencell division of Aventis Pharma (now Sanofi) from April 2002 to November 2002. He was also a founder and vice president of research for Cell Genesys Inc., and a founder of Abgenix, Inc. and Avalanche Biotechnologies, Inc. Dr. Finer received his B.A. in biochemistry and bacteriology from the University of California at Berkeley and his Ph.D. in biochemistry and molecular biology from Harvard University. He completed a postdoctoral fellowship at the Whitehead Institute for Biomedical Research.

David Davidson, M.D.—Dr. Davidson has served as our chief medical officer since February 2012. Prior to joining us, Dr. Davidson served as a senior medical director at Genzyme Corporation, or Genzyme, where he led clinical research for programs in Phases I through IV across a wide range of therapeutic areas for more than a decade. Most recently, Dr. Davidson was the medical leader for Genzyme's gene therapy and Pompe disease enzyme replacement therapy programs. In addition to Dr. Davidson's translational medicine experience, he has also worked on a number of commercial products, including Fabrazyme and Myozyme/Lumizyme, and was integral in crafting the new drug application that resulted in the approval of Welchol. Prior to Genzyme, Dr. Davidson was a medical director at GelTex Pharmaceuticals Inc. Previously, he completed clinical and research fellowships in infectious diseases at the Harvard Longwood Combined Infectious Diseases Program. Dr. Davidson received his B.A. from Columbia University and his M.D. from New York University School of Medicine. In addition, he completed an internal medicine internship, residency training and an endocrinology research fellowship at the University of Chicago Hospitals.

Jason F. Cole, Esq. – Mr. Cole has served as our Senior Vice President, General Counsel and Secretary since March 2014. Prior to joining us, Mr. Cole served as Executive Vice President, Corporate Development and General Counsel at Zalicus Inc. from September 2011 through March 2014, and as Senior Vice President, General Counsel of Zalicus and its predecessor company CombinatoRx, Incorporated from January 2006 to September 2011. From 1999 to 2006, Mr. Cole was a corporate and securities attorney at Ropes & Gray LLP. Mr. Cole holds an A.B. in government from Dartmouth College and a J.D. from Columbia University School of Law.

Eric Sullivan – Mr. Sullivan has served as our Senior Director of Finance since November 2013. Previously, Mr. Sullivan served as Controller of Merrimack Pharmaceuticals from January 2011 to November 2013 and as Assistant Controller of Merrimack Pharmaceuticals from September 2008 to December 2010. Prior to Merrimack Pharmaceuticals, Mr. Sullivan held positions at NSTAR and PricewaterhouseCoopers LLP. Mr. Sullivan received his B.S. in accountancy from Bentley University (formerly known as Bentley College) and is a Certified Public Accountant in Massachusetts.

THE BOARD OF DIRECTORS AND ITS COMMITTEES

Board Composition

We currently have eight directors and the terms of office of the directors are divided into three classes:

- Class I, whose term will expire at the annual meeting of stockholders to be held in 2014;
- Class II, whose term will expire at the annual meeting of stockholders to be held in 2015; and
- Class III, whose term will expire at the annual meeting of stockholders to be held in 2016.

Class I consists of Dr. Gillis and Mr. Leschly, Class II consists of Mr. Lynch, Dr. Maraganore and Dr. Tepper and Class III consists of Dr. Dixon, Dr. Mandell and Dr. Schenkein. At each annual meeting of stockholders, the successors to directors whose terms will then expire shall serve from the time of election and qualification until the third annual meeting following election and until their successors are duly elected and qualified. A resolution of the board of directors may change the authorized number of directors. Any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one-third of the directors. This classification of the board of directors may have the effect of delaying or preventing changes in control or management of our company.

Board Independence

Our board of directors has determined, upon the recommendation of our nominating and corporate governance committee, that each of our directors, except for Nick Leschly, who serves as our President and Chief Executive Officer, has no relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and is independent within the meaning of the director independence standards of Nasdaq Stock Market, or Nasdaq, rules and the SEC. At least annually, our board of directors will evaluate all relationships between us and each director in light of relevant facts and circumstances for the purposes of determining whether a material relationship exists that might signal a potential conflict of interest or otherwise interfere with such director's ability to satisfy his or her responsibilities as an independent director. Based on this evaluation, our board of directors will make an annual determination of whether each director is independent within the meaning of Nasdaq's, and the SEC's independence standards.

Board Meetings and Attendance

Our board of directors held nine meetings during the fiscal year ended December 31, 2013. Each of the directors attended at least 75% of the meetings of the board of directors and the committees of the board of directors on which he or she served during the fiscal year ended December 31, 2013 (in each case, which were held during the period for which he or she was a director and/or a member of the applicable committee). bluebird encourages its directors to attend the Annual Meeting of Stockholders.

Board Committees

Our board of directors has established three standing committees: the audit committee, the compensation committee and the nominating and corporate governance committee, each of which is comprised solely of independent directors, and is described more fully below. Each of the audit, compensation and nominating and corporate governance committee operates pursuant to a written charter and each committee reviews and assesses the adequacy of its charter and submits its charter to the Board for approval. The charters for the audit, compensation and nominating and corporate governance committees are all available on our website (www.bluebirdbio.com) under "Investors and Media" at "Corporate Governance."

Audit Committee

Our audit committee is composed of Dr. Dixon, Dr. Gillis and Mr. Lynch, with Dr. Gillis serving as chairman of the committee. Our board of directors has determined that each member of the audit committee meets the independence requirements of Rule 10A-3 under the Exchange Act and the applicable listing standards of Nasdaq. Our board of directors has determined that Mr. Lynch is an "audit committee financial expert" within the meaning of the SEC regulations and applicable listing standards of Nasdaq. During the fiscal year ended December 31, 2013, the Audit Committee met six times. The report of the Audit Committee is included in this Proxy Statement under "Report of the Audit Committee." The audit committee's responsibilities include:

- appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;
- approving audit and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
- reviewing the audit plan with the independent registered public accounting firm and members of management responsible for preparing our financial statements;
- reviewing and discussing with management and the independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
- reviewing the adequacy of our internal control over financial reporting;
- establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
- recommending, based upon the audit committee's review and discussions with management and the independent registered public accounting firm, whether our audited financial statements shall be included in our Annual Report on Form 10-K;
- monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
- preparing the audit committee report required by the rules of the Securities and Exchange Commission, or SEC, to be included in our annual proxy statement;
- reviewing all related party transactions for potential conflict of interest situations and approving all such transactions; and
- reviewing quarterly earnings releases and scripts.

Compensation Committee

Our compensation committee is composed of Mr. Lynch, Dr. Maraganore and Dr. Tepper, with Mr. Lynch serving as chairman of the committee. Our board of directors has determined each member of the compensation committee is "independent" as defined under the applicable listing standards of Nasdaq. In addition, each

member qualifies as an “outside director” within the meaning of Section 162(m) of the Internal Revenue Code of 1986, as amended. During the fiscal year ended December 31, 2013, the compensation committee met six times. The compensation committee’s responsibilities include:

- annually reviewing and approving corporate goals and objectives relevant to the compensation of our chief executive officer;
- evaluating the performance of our chief executive officer in light of such corporate goals and objectives and determining the compensation of our chief executive officer;
- reviewing and approving the compensation of our other executive officers;
- appointing, compensating and overseeing the work of any compensation consultant, legal counsel or other advisor retained by the compensation committee;
- conducting the independence assessment outlined in Nasdaq rules with respect to any compensation consultant, legal counsel or other advisor retained by the compensation committee;
- annually reviewing and reassessing the adequacy of the committee charter in its compliance with the listing requirements of Nasdaq;
- reviewing and establishing our overall management compensation, philosophy and policy;
- overseeing and administering our compensation and similar plans;
- reviewing and approving our policies and procedures for the grant of equity-based awards;
- reviewing and making recommendations to the board of directors with respect to director compensation;
- reviewing and discussing with management the compensation discussion and analysis to be included in our annual proxy statement or Annual Report on Form 10-K; and
- reviewing and discussing with the board of directors corporate succession plans for the chief executive officer and other key officers.

Historically, our compensation committee has made most of the significant adjustments to annual compensation, determined bonus and equity awards and established new performance objectives at one or more meetings held during the last quarter of the year. However, our compensation committee also considers matters related to individual compensation, such as compensation for new executive hires, as well as high-level strategic issues, such as the efficacy of the Company’s compensation strategy, potential modifications to that strategy and new trends, plans or approaches to compensation, at various meetings throughout the year. Generally, the compensation committee’s process comprises two related elements: the determination of compensation levels and the establishment of performance objectives for the current year. For executives other than the chief executive officer, our compensation committee solicits and considers evaluations and recommendations submitted to the compensation committee by the chief executive officer. In the case of the chief executive officer, the evaluation of his performance is conducted by the compensation committee, which determines any adjustments to his compensation as well as awards to be granted. For all executives and directors as part of its deliberations, the compensation committee may review and consider, as appropriate, materials such as financial reports and projections, operational data, tax and accounting information, tally sheets that set forth the total compensation that may become payable to executives in various hypothetical scenarios, executive and director stock ownership information, company stock performance data, analyses of historical executive compensation levels and current Company-wide compensation levels and recommendations of our Vice President, Human Resources, including analyses of executive and director compensation paid at a peer group of other companies approved by our compensation committee.

Nominating and Corporate Governance Committee

Our nominating and corporate governance committee is composed of Dr. Mandell and Dr. Schenkein, with Dr. Schenkein serving as chairman of the committee. Our board of directors has determined that each member of the nominating and corporate governance committee is “independent” as defined under the applicable listing standards of Nasdaq. During fiscal year ended December 31, 2013, the nominating and corporate governance committee met one time. The nominating and corporate governance committee’s responsibilities include:

- developing and recommending to the board of directors criteria for board and committee membership;
- establishing procedures for identifying and evaluating board of director candidates, including nominees recommended by stockholders;
- identifying individuals qualified to become members of the board of directors;
- recommending to the board of directors the persons to be nominated for election as directors and to each of the board’s committees;
- developing and recommending to the board of directors a set of corporate governance guidelines; and
- overseeing the evaluation of the board of directors and management. Our board of directors may establish other committees from time to time.

Identifying and Evaluating Director Nominees

Our board of directors is responsible for selecting its own members. The Board delegates the selection and nomination process to the nominating and corporate governance committee, with the expectation that other members of the Board, and of management, will be requested to take part in the process as appropriate.

Generally, our nominating and corporate governance committee identifies candidates for director nominees in consultation with management, through the use of search firms or other advisors, through the recommendations submitted by stockholders or through such other methods as the nominating and corporate governance committee deems to be helpful to identify candidates. Once candidates have been identified, our nominating and corporate governance committee confirms that the candidates meet all of the minimum qualifications for director nominees established by the nominating and corporate governance committee. The nominating and corporate governance committee may gather information about the candidates through interviews, detailed questionnaires, background checks or any other means that the nominating and corporate governance committee deems to be appropriate in the evaluation process. The nominating and corporate governance committee then meets as a group to discuss and evaluate the qualities and skills of each candidate, both on an individual basis and taking into account the overall composition and needs of our board of directors. Based on the results of the evaluation process, the nominating and corporate governance committee recommends candidates for the Board’s approval as director nominees for election to the Board.

Minimum Qualifications

Our nominating and corporate governance committee will consider, among other things, the following qualifications, skills and attributes when recommending candidates for the Board’s selection as nominees for the Board and as candidates for appointment to the Board’s committees. The nominee shall have the highest personal and professional integrity, shall have demonstrated exceptional ability and judgment, and shall be most effective, in conjunction with the other nominees to the Board, in collectively serving the long-term interests of the stockholders.

In evaluating proposed director candidates, our nominating and corporate governance committee may consider, in addition to the minimum qualifications and other criteria for board membership approved by the Board from time to time, all facts and circumstances that it deems appropriate or advisable, including, among other things, diversity and is not limited to race, gender or national origin, the skills of the proposed director

candidate, his or her depth and breadth of professional experience or other background characteristics, his or her independence and the needs of the Board. We have no formal policy regarding board diversity. Our nominating and corporate governance committee's priority in selecting board members is identification of persons who will further the interests of our company through his or her established record of professional accomplishment, the ability to contribute positively to the collaborative culture among board members, and professional and personal experiences and expertise relevant to our growth strategy. The nominating and corporate governance committee will consider candidates recommended by stockholders. The policy adopted by the nominating and corporate governance committee provides that candidates recommended by stockholders are given appropriate consideration in the same manner as other candidates.

Non-Management Director Meetings

In addition to the meetings of the committees of the board of directors described above, in connection with the board of directors meetings, the non-management directors met twice in executive session during the fiscal year ended December 31, 2013. The Chairman of the board of directors presides at these executive sessions. The audit committee and the board of directors have established a procedure whereby interested parties may make their concerns known to non-management directors, which is described on our website.

Leadership structure and risk oversight

Our board of directors is currently chaired by Mr. Lynch. As a general policy, our board of directors believes that separation of the positions of chairman and chief executive officer reinforces the independence of the board of directors from management, creates an environment that encourages objective oversight of management's performance and enhances the effectiveness of the board of directors as a whole. As such, Mr. Leschly serves as our president and chief executive officer while Mr. Lynch serves as our chairman of the board of directors but is not an officer.

Our board of directors oversees the management of risks inherent in the operation of our business and the implementation of our business strategies. Our board of directors performs this oversight role by using several different levels of review. In connection with its reviews of the operations and corporate functions of our company, our board of directors addresses the primary risks associated with those operations and corporate functions. In addition, our board of directors reviews the risks associated with our company's business strategies periodically throughout the year as part of its consideration of undertaking any such business strategies.

Each of our board committees also oversees the management of our company's risk that falls within the committee's areas of responsibility. In performing this function, each committee has full access to management, as well as the ability to engage advisors. Our chief operating officer, general counsel and principal accounting officer all periodically provide reports to the audit committee and are responsible for identifying, evaluating and implementing risk management controls and methodologies to address any identified risks. In connection with its risk management role, our audit committee meets privately with representatives from our independent registered public accounting firm. The audit committee oversees the operation of our risk management program, including the identification of the primary risks associated with our business and periodic updates to such risks, and reports to our board of directors regarding these activities.

Compensation committee interlocks and insider participation

None of the members of our compensation committee has at any time during the prior three years been one of our officers or employees. None of our executive officers currently serves, or in the past fiscal year has served, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving on our board of directors or compensation committee. For a description of transactions between us and members of our compensation committee and affiliates of such members, please see "Certain relationships and related party transactions."

EXECUTIVE AND DIRECTOR COMPENSATION

Executive Compensation

Summary Compensation Table

The following table sets forth the compensation earned during the fiscal years ended December 31, 2013 and December 31, 2012 to our chief executive officer and our next two highest-paid executive officers as of December 31, 2013. We refer to these officers as our named executive officers.

<u>Name and Principal Position</u>	<u>Year</u>	<u>Salary(\$)</u>	<u>Option awards(\$)(1)</u>	<u>Non-equity incentive plan compensation(\$)</u>	<u>Total(\$)</u>
Nick Leschly	2013	392,538	1,844,454	234,000(2)	2,470,992
President and Chief Executive Officer	2012	346,085	130,738	124,200(3)	601,023
Jeffrey T. Walsh	2013	321,692	395,790	147,840(2)	865,322
Chief Operating Officer	2012	300,758	—	108,000(3)	408,758
Mitchell Finer, Ph.D.	2013	307,177	640,435	126,378(2)	1,073,990
Chief Scientific Officer(4)					

- (1) The amounts reported in the “Option awards” column above represent the grant date fair value of the stock options granted to such officers during 2012 and 2013 as computed in accordance with Accounting Standards Codification, or ASC, Topic 718, not including any estimates of forfeitures related to service-based vesting conditions. See note 12 of “Notes to Consolidated Financial Statements” in our Annual Report on Form 10-K filed with the SEC on March 5, 2014 for a discussion of assumptions made by the Company in determining the grant date fair value of our Option awards for the fiscal years ended December 31, 2013 and 2012. Note that the amounts reported in this column reflect the accounting cost for these stock options, and do not correspond to the actual economic value that may be received by the named executive officers from the options.
- (2) Amounts represent cash bonuses earned in 2013, and paid during 2014, based on achievement of performance goals and other factors deemed relevant by our board of directors. Our 2013 company objectives related primarily to clinical development, business development and financing achievements.
- (3) Amounts represent cash bonuses earned in 2012, and paid during 2013, based on achievement of performance goals and other factors deemed relevant by our board of directors. Our 2012 company objectives related primarily to clinical development and business development achievements.
- (4) Compensation information is not provided for Dr. Finer for the fiscal year ended December 31, 2012, as Dr. Finer was not a named executive officer as of the end of such fiscal year.

Narrative Disclosure to Summary Compensation Table

Employment arrangements with our named executive officers

Nick Leschly. We have entered into an amended and restated employment agreement, effective as of the closing of our initial public offering on June 24, 2013, with Nick Leschly for the position of president and chief executive officer. Mr. Leschly currently receives a base salary of \$425,000, which is subject to adjustment at the discretion of the board of directors. Mr. Leschly is also eligible for an annual performance bonus of up to 55% of his base salary, payable at the discretion of the board of directors. Mr. Leschly is eligible to participate in our employee benefit plans, subject to the terms of those plans.

Jeffrey T. Walsh. We have entered into an amended and restated employment agreement, effective as of the closing of our initial public offering on June 24, 2013, with Jeffrey T. Walsh for the position of chief operating officer. Mr. Walsh currently receives a base salary of \$328,000, which is subject to adjustment at the discretion of the board of directors. Mr. Walsh is also eligible for an annual performance bonus of up to 40% of his base salary, payable at the discretion of the board of directors. Mr. Walsh is eligible to participate in our employee benefit plans, subject to the terms of those plans.

Mitchell Finer, Ph.D. We have entered into an amended and restated employment agreement, effective as of the closing of our initial public offering on June 24, 2013, with Mitchell Finer for the position of chief scientific officer. Dr. Finer currently receives a base salary of \$316,000, which is subject to adjustment at the discretion of the board of directors. Dr. Finer is also eligible for an annual performance bonus of up to 35% of his base salary, payable at the discretion of the board of directors. Dr. Finer is eligible to participate in our employee benefit plans, subject to the terms of those plans.

These employment agreements also contain provisions that provide for certain payments and benefits in the event of an involuntary termination of employment. In addition, the named executive officers may be entitled to accelerated vesting of their outstanding and unvested awards in certain circumstances. The information below describes certain compensation that may become due payable as a result of certain events. These payments and benefits are in addition to benefits available generally to salaried employees, including distributions under our Section 401(k) plan, accrued benefits under our health and welfare plans and arrangements and vacation pay or other accrued benefits under our medical and dental insurance plans, that are not generally described. Outstanding equity awards for the named executive officers as of December 31, 2013 are set forth under “Outstanding equity awards at December 31, 2013.”

Involuntary termination of employment

Pursuant to their employment agreements, each named executive officer is eligible to receive certain payments and benefits in the event his employment is terminated by us without “cause” (as defined in his employment agreement) or in the event he terminates his employment with “good reason” (as defined in his employment agreement). Upon the timely execution of a severance agreement, including a general release of claims, each named executive officer is eligible to receive the following payments and benefits:

- 12 months of base salary continuation; and
- if he elects to continue his group healthcare benefits, to the extent authorized by and consistent with COBRA, we will pay the named executive officer a monthly cash payment equal to the monthly employer contribution we would have made to provide him health insurance if he had remained employed by us until the earlier of (1) 12 months following the date of termination or (2) the end of the named executive officer’s COBRA health continuation period.

Sale event

Pursuant to the employment agreements and the award agreements governing equity awards granted to the named executive officers prior to the date of the employment agreements, in the event of a “sale event” of the company (as defined in the 2010 Stock Option and Grant Plan), any such unvested stock options or other stock-based awards will immediately accelerate, vest and become fully exercisable or non-forfeitable as of the effective date of the sale event.

In addition, in the event that any of the named executive officers terminates his employment with us for good reason or his employment with us is terminated by us without cause, in each case within 12 months following a “sale event” (as defined in the 2013 Stock Option and Incentive Plan), he will be entitled to receive the following payments and benefits upon the timely execution of a severance agreement, including a general release of claims:

- a lump sum cash payment equal to one times (or one and a half times in the case of Mr. Leschly) the sum of (1) the named executive officer’s then-current base salary (or base salary in effect immediately prior to the sale event, if higher) and (2) the named executive officer’s target annual incentive compensation; and
- if he elects to continue his group healthcare benefits, to the extent authorized by and consistent with COBRA, we will pay the named executive officer a monthly cash payment equal to the monthly

employer contribution we would have made to provide him health insurance if he had remained employed by us until the earlier of (1) 12 months (or 18 months in the case of Mr. Leschly) following the date of termination or (2) the end of the named executive officer's COBRA health continuation period; and

- all stock options and other stock-based awards granted to the named executive officer after the date of his employment agreement will become fully exercisable and non-forfeitable as of the date of the named executive officer's termination.

Definitions

For purposes of Mr. Leschly's employment agreement, "cause" means his:

- commission of any felony or commission of any crime involving fraud, dishonesty or moral turpitude;
- commission or attempted commission of, or participation in, a fraud or act of dishonesty against us;
- material breach of any contract between Mr. Leschly and us or material breach of any legal duty Mr. Leschly owes to us;
- conduct that constitutes insubordination, incompetence or neglect of duties; or
- failure to perform the duties, functions and responsibilities of his position.

For purposes of each of the employment agreements with Mr. Walsh and Dr. Finer, "cause" means the named executive officer's:

- dishonest statements or acts with respect to us or any of our affiliates, or any of our current or prospective customers, suppliers, vendors or other third parties with which such entity does business;
- commission of any felony or any misdemeanor involving moral turpitude, deceit, dishonesty or fraud;
- failure to perform assigned duties to our reasonable satisfaction, which failure continues, in our reasonable judgment, after written notice to the named executive officer;
- gross negligence, willful misconduct or insubordination with respect to us or any of our affiliates; or
- violation of any provision of any agreement(s) between the named executive officer and us relating to noncompetition, nondisclosure and/or assignment of inventions.

For purposes of the each of the employment agreements with the named executive officers, "good reason" means:

- a material diminution in the named executive officer's responsibilities, authority and function;
- a material reduction in base salary other than pursuant to a salary reduction program affecting substantially all of our employees (or senior executives in the case of Dr. Finer) that does not adversely affect the named executive officer to a greater extent than other similarly situated employees; provided, however, that any reduction in base salary that exceeds 10% of the named executive officer's then-current base salary shall constitute good reason;
- a material change in the geographic location (of more than 30 miles in the case of Mr. Walsh) at which the named executive officer must regularly report to work or perform services, except for required travel on business (for Mr. Walsh and Dr. Finer, to an extent substantially consistent with usual business travel obligations); and
- a material breach by us of any provision of our equity incentive plans or award agreements thereunder or any other material agreement between the named executive officer and us concerning the terms of the named executive officer's employment, benefits or compensation.

In addition, under Mr. Leschly's employment agreement, "good reason" also includes:

- an adverse change in the his job title or a change in reporting relationship as a result of which he no longer reports to our board of directors; and
- removal from, or failure to be elected to, our board of directors.

Executive Compensation Elements

The following describes the material terms of the elements of our executive compensation program during 2013.

2013 Base Salaries

Beginning as of the closing of our initial public offering on June 24, 2013 and through December 31, 2013, Mr. Leschly, Mr. Walsh and Dr. Finer had their base salaries set at annual rates of \$390,000, \$320,000 and \$306,000, respectively.

2013 Performance Bonuses

Each named executive officer is eligible for an annual performance bonus based upon the achievement of certain corporate performance goals and objectives approved by our Compensation Committee and individual performance.

Bonuses are set based on the executive officer's base salary as of the end of the bonus year, and are expected to be paid out in the first quarter of the following year. Pursuant to their amended and restated employment agreements Mr. Leschly, Mr. Walsh and Dr. Finer were eligible for performance bonuses of up to 50%, 40% and 35% of their respective base salaries. Our chief executive officer's bonus is based entirely on performance relative to corporate objectives and the bonus of our other named executive officers s based 90% on corporate objectives and 10% on individual objectives.

At the beginning of each year, the board of directors (considering the recommendations of management) sets corporate goals and milestones for the year. These goals and milestones and the proportional emphasis placed on each are set by our Compensation Committee after considering management input and our overall strategic objectives. These goals generally relate to factors such as research and development objectives and other factors primarily within management's control. Our Compensation Committee determines the level of achievement of the corporate goals for each year. This achievement level is then applied to each named executive officer's target bonus to determine that year's total bonus award.

All final bonus payments to our named executive officers are determined by our Compensation Committee, which retains full discretion to adjust individual target bonus awards. The actual bonuses, if any, awarded in a given year may vary from target, depending on individual performance and the achievement of corporate objectives and may also vary based on other factors at the discretion of our Compensation Committee. However, an actual bonus would normally only exceed the target percentage for the executive if there were extraordinary performance during the year, as determined by our Compensation Committee.

For 2013, the corporate performance objectives generally fell into the categories of progress of the Company's research and development pipeline, corporate development accomplishments, the completion of the Company's initial public offering and successfully managing the company's growth. In evaluating management's performance relative to corporate performance for 2013, our Compensation Committee determined to award a corporate achievement level of 120%. This achievement level was then used to determine each named executive officer's bonus. The bonuses paid to our named executive officers for 2013 are set forth in the "Summary Compensation Table" above.

2013 Stock Option Awards

In January 2013, the Compensation Committee awarded the following stock options to our named executive officers: Mr. Leschly: options to purchase 480,702 shares; Mr. Walsh: options to purchase 103,151 shares; and Dr. Finer: options to purchase 165,047 shares. Each of these stock option awards had performance-based vesting criteria tied to progress with the Company's clinical development pipeline and entering into the collaboration agreement with Celgene, and, in the case of Mr. Leschly, the completion of our initial public offering. These stock options have a ten-year term and would commence vesting over four years upon the achievement of the relevant performance criteria by a particular date. The performance-based vesting criteria for all of these awards were achieved at various times during 2013, and commenced time-based vesting in accordance with their terms. Each of the stock option awards has an exercise price of \$5.50 per share, the fair market value of our common stock as of the date of grant. The grant date fair value of the stock option awards for our named executive officers for 2013 are set forth in the "Summary Compensation Table" above.

Health and Welfare Benefits

Our named executive officers are eligible to participate in all of our employee benefit plans, including our medical, dental, vision, group life and disability insurance plans, in each case on the same basis as other employees. We believe that these health and welfare benefits help ensure that we have a productive and focused workforce through reliable and competitive health and other benefits.

Retirement Savings

All of our full-time employees in the United States, including our named executive officers, are eligible to participate in our 401(k) plan. Pursuant to our 401(k) plan, employees may elect to reduce their current compensation by up to the statutorily prescribed annual limit (which was \$17,500 in 2013), with additional salary deferrals not to exceed \$5,500 available to those employees 50 years of age or older, and to have the amount of this reduction contributed to our 401(k) plan.

Perquisites

We do not provide significant perquisites or personal benefits to our named executive officers. We do, however, pay the premiums for term life insurance for our named executive officers.

Equity compensation

Outstanding equity awards at December 31, 2013

The following table sets forth information concerning the outstanding equity awards held by each of the named executive officers as of December 31, 2013.

Name	Option Awards				Stock Awards			
	Number of securities underlying unexercised options exercisable (#)	Number of securities underlying unexercised options unexercisable (#)	Option exercise price (\$/share)	Option expiration date	Number of shares that have not vested (#)	Market value of shares that have not vested \$(1)		
Nick Leschly	86,376	43,188(2)	2.09	7/13/2021	—	—		
	36,521	55,744(3)	2.09	6/4/2022	—	—		
	—	33,649(4)	5.50	1/16/2023	—	—		
	—	81,719(5)	5.50	1/16/2023	—	—		
	—	163,439(6)	5.50	1/16/2023	—	—		
	—	48,070(6)	5.50	1/16/2023	—	—		
	—	153,825(7)	5.50	1/16/2023	—	—		
				68,595(9)	\$1,439,123			
Jeffrey T. Walsh	148,093	81,214(9)	2.09	7/13/2021	—	—		
	—	26,206(10)	2.09	7/13/2021	—	—		
	—	10,315(4)	5.50	1/16/2023	—	—		
	—	25,788(5)	5.50	1/16/2023	—	—		
	—	51,576(6)	5.50	1/16/2023	—	—		
				15,472(6)	5.50	1/16/2023	—	—
Mitchell Finer, M.D	84,908	6,861(11)	0.95	9/15/2020	—	—		
	28,780	14,390(2)	2.09	7/13/2021	—	—		
	8,500	4,250(2)	2.09	7/13/2021	—	—		
	5,046	7,704(12)	2.09	7/13/2021	—	—		
	10,434	15,927(3)	2.09	6/4/2022	—	—		
	—	16,504(4)	5.50	1/16/2023	—	—		
	—	41,262(5)	5.50	1/16/2023	—	—		
	—	82,524(6)	5.50	1/16/2023	—	—		
	—	24,757(6)	5.50	1/16/2023	—	—		
527	— (13)	8.16	4/29/2023	—	—			

- (1) The market value of the restricted stock awards is determined by multiplying the number of shares by \$20.98, the closing price of our common stock on the Nasdaq Global Market on December 31, 2013, the last trading day of 2013.
- (2) Represents options to purchase shares of our common stock granted on July 13, 2011. The shares underlying these options vest as follows: 25% vested on April 15, 2012, with the remainder of the shares vesting in equal monthly installments over the following three years through April 15, 2015. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
- (3) Represents options to purchase shares of our common stock granted on June 4, 2012. The shares underlying these options vest as follows: 25% vested on May 1, 2013, with the remainder of the shares vesting in equal monthly installments over the following three years through May 1, 2016. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
- (4) Represents options to purchase shares of our common stock granted on January 16, 2013 with performance-based vesting criteria that were met as of April 1, 2013. The shares underlying these options vest as follows: 25% vest on April 1, 2014, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.

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- (5) Represents options to purchase shares of our common stock granted on January 16, 2013 with performance-based vesting criteria that were met as of May 1, 2013. The shares underlying these options vest as follows: 25% vest on May 1, 2014, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (6) Represents options to purchase shares of our common stock granted on January 16, 2013 with performance-based vesting criteria that were met as of January 1, 2013. The shares underlying these options vest as follows: 25% vest on January 1, 2014, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (7) Represents options to purchase shares of our common stock granted on January 16, 2013 with performance-based vesting criteria that were met as of June 24, 2013. The shares underlying these options vest as follows: 25% vest on July 1, 2014, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (8) Under the terms of Mr. Leschly's November 15, 2010 restricted stock agreement, the remaining unvested shares will vest in equal monthly installments through October 1, 2014. Vesting of all restricted shares shall accelerate in connection with an acquisition event pursuant to the terms of the restricted stock agreement.
 - (9) Represents options to purchase shares of our common stock granted on July 13, 2011. The shares underlying these options vest as follows: 25% vest on May 16, 2012, with the remainder of the shares vesting in equal monthly installments over the following three years through May 16, 2015. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (10) Represents options to purchase shares of our common stock granted on July 13, 2011 with performance-based vesting criteria that were met as of April 1, 2013. The shares underlying these options vest as follows: 25% vest upon April 1, 2014, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (11) Represents options to purchase shares of our common stock granted on September 15, 2010. The shares underlying these options vest as follows: 12.5% were vested on the date of grant, with the remainder of the shares vesting in equal monthly installments starting on October 8, 2010 through March 8, 2014. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (12) Represents options to purchase shares of our common stock granted on July 13, 2011 with performance-based vesting criteria that were met as of May 1, 2013. The shares underlying these options vest as follows: 25% vested on May 1, 2013, with the remainder of the shares vesting in equal monthly installments over the following three years. Vesting of all unvested shares shall accelerate in connection with an acquisition event pursuant to the terms of the option agreement.
 - (13) Represents options to purchase shares of our common stock granted on April 29, 2013. The shares underlying these options were fully vested upon grant.

Director Compensation

The following table sets forth a summary of the compensation we paid to our non-employee directors during 2013. Other than as set forth in the table and described more fully below, we did not pay any compensation, reimburse any expense of, make any equity awards or non-equity awards to, or pay any other compensation to any of the other non-employee members of our board of directors in 2013. Mr. Leschly, our president and chief executive officer, receives no compensation for his service as a director, and, consequently, is not included in this table. The compensation received by Mr. Leschly as an employee during 2013 is presented in "Summary Compensation Table" above.

<u>Name(1)</u>	<u>Fees earned or paid in cash(\$)</u>	<u>Option awards\$(2)</u>	<u>Total(\$)</u>
Wendy Dixon, Ph.D.	37,958	357,642	395,600
Steven Gillis, Ph.D.	39,167	—	39,167
Daniel S. Lynch	91,875	99,125	191,000
John M. Maraganore, Ph. D	45,333	49,563	94,896
Geert-Jan Mulder, Ph. D.(3)	—	—	—
Axel Polack, M.D.(4)	12,717	—	12,717
David Schenkein, M.D..	34,433	357,642	392,075
Robert Tepper, M.D(5).	—	—	—

- (1) The aggregate number of stock option awards outstanding as of December 31, 2013 for the non-employee members of the board of directors was: Dr. Dixon: 26,361, Mr. Lynch: 91,342, Dr. Maraganore: 46,546 and Dr. Schenkein: 26,361. None of the other non-employee members of our board of directors held options to purchase common stock or any other unvested share-based awards as of that date.
- (2) The amounts reported in the Option awards column represent the grant date fair value of the stock options granted to our non-employee directors during 2013 as computed in accordance with Accounting Standards Codification, or ASC, Topic 718, not including any estimates of forfeitures. See note 12 of "Notes to Consolidated Financial Statements" in our Annual Report on Form 10-K filed with the SEC on March 5, 2014 for a discussion of assumptions made by the Company in determining the grant date fair value of our Option awards for the fiscal year ended December 31, 2013. Note that the amounts reported in this column reflect the accounting cost for these stock options, and do not correspond to the actual economic value that may be received by the named executive officers from the options.
- (3) Ceased serving as a member of the board of directors on June 24, 2013.
- (4) Ceased serving as a member of the board of directors on January 7, 2014.
- (5) Dr. Tepper has voluntarily waived the receipt of director compensation.

Certain of our non-employee directors, including Drs. Dixon, Maraganore and Schenkein, and Mr. Lynch were granted options to purchase shares of our common stock in connection with their appointment to the board of directors prior to our initial public offering. These stock options were all granted at fair market value on the date of grant.

Our board of directors has adopted a non-employee director compensation policy, effective as of the closing of our initial public offering on June 24, 2013, that is designed to provide a total compensation package that enables us to attract and retain, on a long-term basis, high caliber non-employee directors. Under the policy, all non-employee directors are paid cash compensation from and after the completion of our initial public offering, as set forth below:

	<u>Annual Retainer</u>
Board of Directors:	
All non-employee members	\$ 35,000
Additional retainer for Non-Executive Chairman of the Board	\$ 35,000
Audit Committee:	
Chairman	\$ 15,000
Non-Chairman members	\$ 7,500
Compensation Committee:	
Chairman	\$ 10,000
Non-Chairman members	\$ 5,000
Nominating and Corporate Governance Committee:	
Chairman	\$ 7,000
Non-Chairman members	\$ 3,000

Under the non-employee director compensation policy, each person who is initially appointed or elected to the board of directors will be eligible for an option grant to purchase up to 13,708 shares of our common stock under our stock option plan on the date he or she first becomes a non-employee director, which will vest annually over a three-year period. The board of directors or compensation committee may exercise its discretion to provide for a different number of options in the event it determines a variation from the stated amount is warranted. In addition, on the date of the annual meeting of stockholders, each continuing non-employee director who has served on the board of directors for a minimum of six months will be eligible to receive an annual option grant to purchase up to 6,854 shares of our common stock, which will vest in full upon the earlier of the first anniversary of the date of grant or the date of the following annual meeting of stockholders. All of the foregoing options will be granted at fair market value on the date of grant.

Compensation risk assessment

We believe that our executive compensation program does not encourage excessive or unnecessary risk taking. This is primarily due to the fact that our compensation programs are designed to encourage our executive officers and other employees to remain focused on both short-term and long-term strategic goals, in particular in connection with our pay-for-performance compensation philosophy. As a result, we do not believe that our compensation programs are reasonably likely to have a material adverse effect on us.

Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The following table sets forth the amount of common stock of bluebird beneficially owned, directly or indirectly, as of April 21, 2014, by (i) each current director of bluebird, (ii) each named executive officer of bluebird, (iii) all directors and current executive officers of bluebird as a group, and (iv) each person who is known to bluebird to beneficially own more than five percent (5%) of the outstanding shares of common stock of bluebird, as determined through SEC filings, and the percentage of the common stock outstanding represented by each such amount. All shares of common stock shown in the table reflect sole voting and investment power except as otherwise noted.

Beneficial ownership is determined by the rules of the Securities and Exchange Commission and includes voting or investment power of the securities. As of April 21, 2014, bluebird had 24,364,335 shares of common stock outstanding. Shares of common stock subject to options or other rights to purchase which are now exercisable or are exercisable within 60 days after April 21, 2014 are to be considered outstanding for purposes of computing the percentage ownership of the persons holding these options or other rights but are not to be considered outstanding for the purpose of computing the percentage ownership of any other person. Unless otherwise indicated, the address for each person listed below is c/o bluebird bio, Inc., 150 Second Street, Third Floor, Cambridge, Massachusetts 02141.

<u>Name and Address of Beneficial Owner</u>	<u>Number of Shares Beneficially Owned</u>	<u>Percentage of Shares Beneficially Owned</u>
5% Stockholders		
Entities affiliated with FMR LLC (1)	3,567,031	14.6%
Third Rock Ventures L.P. (2)	3,313,974	13.6%
Capital Research Global Investors (3)	2,612,792	10.7%
TVM V Life Science Ventures GmbH & Co. KG (4)	2,254,357	9.3%
ARCH Venture Fund VII, L.P. (5)	1,793,588	7.4%
Coöperative AAC LS U.A. (Forbion) (6)	1,251,526	5.1%
Directors and Named Executive Officers		
Nick Leschly (7)	566,796	2.3%
Wendy L. Dixon, Ph.D. (8)	8,787	*
Steven Gillis, Ph.D. (9)	1,793,588	7.4%
Daniel S. Lynch (10)	61,009	*
James Mandell, M.D.	—	*
John M. Maraganore, Ph.D. (11)	31,389	*
David P. Schenkein, M.D. (12)	8,787	*
Robert I. Tepper, M.D.(13)	3,313,974	13.6%
Jeffrey T. Walsh (14)	194,134]	*
Mitchell Finer, Ph. D. (15)	192,915	*
All executive officers and directors as a group (13 persons)(16)	6,246,837	24.8%

* Represents holdings of less than 1%

- (1) The address for FMR LLC is 245 Summer Street, Boston, Massachusetts 02210. Based solely on a Schedule 13G/A filed with the SEC on February 14, 2014, FMR LLC has sole voting power with respect to 8,800 shares and sole dispositive power with respect to all 3,567,031 shares. In addition, FMR LLC indicated as follows: Fidelity Management & Research Company (Fidelity), a wholly-owned subsidiary of FMR LLC and an investment adviser registered under Section 203 of the Investment Advisers Act of 1940 with its principal place of business at 245 Summer Street, Boston, Massachusetts 02210, beneficially owns 3,356,263, or 13.8%, of the shares as a result of acting as investment adviser to various investment companies registered under Section 8 of the Investment Company Act of 1940. Edward C. Johnson 3d and FMR LLC, through its control of Fidelity, and the funds each has sole power to dispose of the 3,356,263 shares owned by the funds. Neither FMR LLC nor Edward C. Johnson 3d, Chairman of FMR LLC, has the

sole power to vote or direct the voting of the shares owned directly by the Fidelity funds, which power resides with the funds' Boards of Trustees. Fidelity carries out the voting of the shares under written guidelines established by the funds' Boards of Trustees. Fidelity SelectCo, LLC ("SelectCo"), a wholly-owned subsidiary of FMR LLC and an investment adviser registered under Section 203 of the Investment Advisers Act of 1940 with its principal place of business at 1225 17th Street, Suite 1100, Denver Colorado 80202, is the beneficial owner of 201,968 shares as a result of acting as investment adviser to various companies registered under Section 8 of the Investment Advisers Act of 1940. Edward C. Johnson 3d and FMR LLC, through its control of SelectCo, and the SelectCo funds each has sole power to dispose of 201,968 shares owned by the SelectCo funds. Fidelity Growth Company Fund beneficially owns 1,254,172, or 5.1%, of the shares. Pyramis Global Advisors, LLC (PGALLC), an indirect wholly-owned subsidiary of FMR LLC and a bank as defined in Section 3(a)(6) of the Securities Exchange Act of 1934 with its principal place of business at 900 Salem Street, Smithfield, Rhode Island 02917, beneficially owns 8,800 of the shares as a result of its serving as investment manager to institutional accounts owning such shares. Edward C. Johnson 3d and FMR LLC, through its control of PGALLC, each has sole power to dispose of 8,800 shares and sole power to vote or to direct the voting of 8,800 shares owned by institutional accounts or funds advised by PGALLC.

- (2) The address for Third Rock Ventures L.P. is 29 Newbury Street, Boston, Massachusetts 02116. Based solely on a Schedule 13G filed with the SEC on February 12, 2014, all shares are held directly by Third Rock Ventures, L.P. ("TRV LP"). Each of Third Rock Ventures GP, LP ("TRV GP"), the general partner of TRV LP, and TRV GP, LLC ("TRV LLC"), the general partner of TRV GP, may be deemed to have voting and dispositive power over the shares held by TRV LP. Investment decisions with respect to the shares held by TRV LP are made by an investment committee at TRV GP comprised of Mark Levin, Kevin Starr, Bob Tepper, Neil Exter, Kevin Gillis, Lou Tartaglia, Craig Muir, Cary Pfeffer, Alexis Borisy and Craig Greaves. No stockholder, director, officer, manager, member or employee of TRV GP or TRV LLC has beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of any shares held by TRV LP.
- (3) The address for Capital Research Global Investors is 333 S. Hope Street, 55th Floor, Los Angeles, California 90071. Based solely on a Schedule 13G/A filed with the SEC on February 13, 2014, Capital Research Global Investors, a division of Capital Research and Management Company ("CMRC"), beneficially owns and has sole voting and dispositive power of 2,612,792 the shares as a result of CMRC acting as investment advisor to various investment companies registered under Section 8 of the Investment Company Act of 1940.
- (4) The address for TVM V Life Science Ventures GmbH & Co. KG is Maximilianstrasse 35, Entrance C, 80539 Munich, Germany. Based solely on a Form 4 filed with the SEC on June 24, 2013, all shares are held directly by TVM V Life Science Ventures GmbH & Co. KG. ("TVM LSV V"). Its general partner TVM Capital, or TVM, and its authorized officers Axel Polack, Helmut Schuehsler, Alexandra Goll, Hubert Birner and Stefan Fischer may be deemed to share voting and dispositive power over the shares held by TVM LSV V. No stockholder, director, officer, manager, member or employee of TVM and no director, officer, manager, member or employee of TVM LSV V has beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of any shares held by TVM LSV V.
- (5) The address for ARCH Venture Fund VII, L.P. is 8725 West Higgins Road, Suite 290, Chicago, Illinois 60631. Based solely on a Schedule 13G filed with the SEC on February 6, 2014, all shares are held directly by ARCH Venture Fund VII, L.P. ("ARCH VII"). ARCH Venture Partners VII, L.P. (the "GPLP"), as the sole general partner of ARCH VII, may be deemed to beneficially own certain of the shares held of record by ARCH VII. The GPLP disclaims beneficial ownership of all shares held of record by ARCH VII in which the GPLP does not have an actual pecuniary interest. ARCH Venture Partners VII, LLC (the "GPLLC"), as the sole general partner of the GPLP, may be deemed to beneficially own certain of the shares held of record by ARCH VII. The GPLLC disclaims beneficial ownership of all shares held of record by ARCH VII in which it does not have an actual pecuniary interest. Keith Crandell, Clinton Bybee and Robert Nelsen are the managing directors of the GPLLC, and may be deemed to share voting and dispositive power over the shares held of record by ARCH VII. The managing directors disclaim beneficial ownership of all shares held of record by ARCH VII in which they do not have an actual pecuniary interest.

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- Steven Gillis, one of our directors, owns an interest in GPLP. Dr. Gillis does not have voting or disposition authority over the shares held by ARCH VII. Dr. Gillis disclaims beneficial ownership of all shares held of record by ARCH VII in which he does not have an actual pecuniary interest.
- (6) The address for Coöperative AAC LS U.A. is PO Box 5187, 1410 AD Naarden, The Netherlands. Based solely on a Schedule 13G filed with the SEC on February 25, 2014, all shares are held by Coöperative AAC LS U.A., or Coöperative. Forbion 1 Management B.V., or Forbion, the director of Coöperative, may be deemed to have voting and dispositive power over the shares held by Coöperative. Investment decisions with respect to the shares held by Coöperative can be made by any two of the six duly authorized representatives of Coöperative, which comprise directors L.P.A. Bergstein, M.A. van Osch, H.A. Slootweg and proxy holders S.J.H. van Deventer, G.J. Mulder and C. Takke. No stockholder, director, officer, manager, member or employee of Coöperative or Forbion has beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of any shares held by Coöperative.
 - (7) Consists of 309,318 shares of common stock and 257,478 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (8) Consists of 8,787 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (9) Consists of 1,793,588 shares of common stock beneficially owned by ARCH Venture Fund VII, L.P. ARCH Venture Fund VII, L.P. is an affiliated fund of ARCH Venture Partners. Dr. Gillis is a managing director with ARCH Venture Partners and owns an interest in ARCH Venture Partners VII, L.P. Dr. Gillis does not have voting or disposition authority over the shares held by ARCH Venture Fund VII, L.P.
 - (10) Consists of 61,009 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (11) Consists of 31,389 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (12) Consists of 8,787 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (13) Consists of 3,313,974 shares of common stock beneficially owned by Third Rock Ventures, L.P. Dr. Tepper is a partner of Third Rock Ventures, L.P. and is a member of the investment committee of Third Rock Ventures GP, LP, the general partner of Third Rock Ventures, L.P., which may be deemed to have voting and dispositive power over the shares held by Third Rock Ventures, L.P. Dr. Tepper does not have beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of any shares held by Third Rock Ventures, L.P.
 - (14) Consists of 194,134 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (15) Consists of 192,915 shares of common stock underlying options exercisable within 60 days of April 21, 2014.
 - (16) See footnotes 7-15 above. Consists of 5,416,880 shares of common stock and 829,957 shares of common stock underlying options exercisable within 60 days of April 21, 2014. As to disclaimers of beneficial ownership, see footnotes 9 and 13 above.

CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

The following is a description of transactions since January 1, 2013 to which we have been a party, in which the amount involved exceeds \$120,000, and in which any of our directors, executive officers or holders of more than 5% of our capital stock, or an affiliate or immediate family member thereof, had or will have a direct or indirect material interest. We believe the terms obtained or consideration that we paid or received, as applicable, in connection with the transactions described below were comparable to terms available or the amounts that would be paid or received, as applicable, from unaffiliated third parties.

Director and Executive Officer Compensation

Please see “Executive and Director Compensation—Director Compensation” for a discussion of fees paid and options granted to our non-employee directors. Please see “Executive and Director Compensation—Executive Compensation” for additional information regarding compensation of executive officers.

Employment Agreements

We have entered into employment agreements with certain of our executive officers. For more information regarding these agreements, see “Executive and Director Compensation— Employment Agreements with our Named Executive Officers.”

Indemnification Agreements and Directors’ and Officers’ Liability Insurance

We have entered into indemnification agreements with each of our executive officers and directors. We also maintain a general liability insurance policy which covers certain liabilities of directors and officers of our Company arising out of claims based on acts or omissions in their capacities as directors or officers.

Registration Rights Agreements

We entered into an amended and restated investors’ rights agreement, dated as of July 23, 2012, with certain holders of shares of our common stock, including Third Rock Ventures L.P., entities affiliated with Fidelity Investments, entities affiliated with Capital Research and Management Company, TVM V Life Science Ventures GmbH & Co. KG, ARCH Venture Fund VII, L.P. and Coöperative AAC LS U.A. (Forbion). Under the amended and restated investors’ rights agreement, holders of registrable shares can demand that we file a registration statement or request that their shares be included on a registration statement that we are otherwise filing, in either case, registering the resale of their shares of common stock. These registration rights are subject to conditions and limitations, including the right, in certain circumstances, of the underwriters of an offering to limit the number of shares included in such registration and our right, in certain circumstances, not to effect a requested S-1 registration within 60 days before or 180 days following any offering of our securities, or a requested S-3 registration within 30 days before or 90 days following any offering of our securities.

Following December 18, 2013, the holders of at least a majority of the registrable shares may require us to file a registration statement under the Securities Act on a Form S-1 or S-3, if available, at our expense with respect to the resale of their registrable shares, and we are required to use our best efforts to effect the registration. If we propose to register any of our securities under the Securities Act of 1933, as amended, for our own account or the account of any other holder, the holders of registrable shares are entitled to notice of such registration and to request that we include registrable shares for resale on such registration statement, subject to the right of any underwriter to limit the number of shares included in such registration.

We will pay all registration expenses, other than underwriting discounts and commissions, related to any demand or piggyback registration. The amended and restated investors’ rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders, in the event of misstatements or omissions in the registration statement attributable to us except in the event of fraud

and they are obligated to indemnify us for misstatements or omissions attributable to them. The registration rights will terminate upon the later of the date on which all registrable shares have been sold and June 24, 2018.

Procedures for related party transactions

We have adopted a related person transaction approval policy that governs the review of related person transactions at bluebird. Pursuant to this policy, if we want to enter into a transaction with a related person or an affiliate of a related person, our General Counsel will review the proposed transaction to determine, based on applicable Nasdaq and Securities and Exchange Commission rules, if such transaction requires pre-approval by the audit committee and/or board of directors. If pre-approval is required, such matters will be reviewed at the next regular or special audit committee and/or board of directors meeting. We may not enter into a related person transaction unless our General Counsel has either specifically confirmed in writing that no further reviews are necessary or has confirmed that all requisite corporate reviews have been obtained.

SECTION 16(a) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Section 16(a) of the Securities Exchange Act of 1934 requires bluebird's directors, executive officers and persons who own more than 10% of the bluebird common stock to file with the SEC reports of ownership and changes in ownership of bluebird common stock. Such persons are required by regulations of the SEC to furnish bluebird with copies of all such filings. Based on our review of the reports we have received, bluebird believes that all Section 16(a) filing requirements were complied with during the fiscal year ended December 31, 2013.

AUDIT COMMITTEE REPORT (1)

The Audit Committee has reviewed the Company's audited financial statements for the fiscal year ended December 31, 2013 and has discussed these statements with management and representatives of Ernst & Young LLP, the Company's independent registered public accounting firm. Company management is responsible for the preparation of the Company's financial statements and for maintaining an adequate system of disclosure controls and procedures and internal control over financial reporting for that purpose. Ernst & Young LLP is responsible for expressing an opinion on the conformity of the audited financial statements with generally accepted accounting principles, their judgments as to the quality, not just the acceptability, of the Company's accounting principles and such other matters as are required to be discussed with the Audit Committee under generally accepted auditing standards. The Audit Committee is responsible for providing independent, objective oversight of the Company's accounting functions and internal controls.

The Audit Committee also received from, and discussed with, members of Ernst & Young LLP the written disclosures and other communications that the Company's independent registered public accounting firm is required to provide to the Audit Committee, including the matters required to be discussed by Auditing Standard No. 16 (AS 16) (Communication with Audit Committees), as adopted by the Public Company Accounting Oversight Board, or PCAOB. PCAOB AS No. 16 requires our independent registered public accounting firm to discuss with the Audit Committee, among other things, the following:

- methods to account for significant unusual transactions;
- the effect of significant accounting policies in controversial or emerging areas for which there is a lack of authoritative guidance or consensus;
- the process used by management in formulating particularly sensitive accounting estimates and the basis for the independent registered public accounting firm's conclusions regarding the reasonableness of those estimates; and
- disagreements with management regarding financial accounting and reporting matters and audit procedures.

Ernst & Young LLP also provided the Audit Committee with the written disclosures and the letter required by Rule 3526 of the PCAOB. PCAOB Rule 3526 requires independent registered public accounting firms annually to disclose in writing all relationships that in their professional opinion may reasonably be thought to bear on independence, to confirm their perceived independence and engage in a discussion of independence. The Audit Committee has reviewed this disclosure and has discussed with members of Ernst & Young their independence from the Company.

Based on its discussions with management and our independent registered public accounting firm, and its review of the representations and information provided by management and our independent registered public accounting firm, the Audit Committee recommended to the Board of Directors that the audited financial statements be included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2013, for filing with the Securities and Exchange Commission.

Respectfully submitted by the
Audit Committee,
Steven Gillis, Chairperson
Wendy Dixon
Daniel Lynch

(1) This Section is not "soliciting material," is not deemed filed with the SEC and is not to be incorporated by reference in any filing of the Company under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

PROPOSAL 2: RATIFICATION OF SELECTION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The firm of Ernst & Young LLP, independent registered public accounting firm, has been selected by the Audit Committee as auditors for bluebird for the fiscal year ending December 31, 2014. Ernst & Young LLP acted as the independent registered public accounting firm for bluebird for the years ended December 31, 2013 and 2012. A representative of Ernst & Young LLP is expected to be present at the Annual Meeting with the opportunity to make a statement if he desires and to respond to appropriate questions.

The Company's organizational documents do not require that the stockholders ratify the selection of Ernst & Young LLP as the Company's independent registered public accounting firm. bluebird requests such ratification as a matter of good corporate practice. A majority of the votes properly cast is required for the approval of the ratification of the selection of Ernst & Young LLP as our independent registered public accounting firm, and brokers, bankers and other nominees have discretionary voting power on this routine matter. Abstentions and broker non-votes will have no effect on the ratification. If the stockholders do not ratify the selection, the Audit Committee will reconsider whether to retain Ernst & Young LLP, but still may retain this firm. Even if the selection is ratified, the Audit Committee, in its discretion, may change the appointment at any time during the year if it determines that such a change would be in the best interests of bluebird and its stockholders.

The Audit Committee, or a designated member thereof, pre-approves each audit and non-audit service rendered by Ernst & Young LLP to bluebird pursuant to the bluebird Audit and Non-Audit Services Pre-Approval Policy.

Change in Principal Independent Registered Public Accounting Firm

In September 2012, our Audit Committee approved the engagement of Ernst & Young LLP, as our principal independent registered public accounting firm to audit the Company's financial statements for the fiscal year ending December 31, 2012. As a result, McGladrey LLP ceased to serve as the Company's principal independent registered public accountants as of such date.

The audit report of McGladrey LLP on the Company's financial statements, as of and for the fiscal year ended December 31, 2011, did not contain any adverse opinion or disclaimer of opinion, nor were such reports qualified or modified as to uncertainty, audit scope or accounting principles.

During the fiscal year ended December 31, 2011, and the subsequent interim period through our engagement of Ernst & Young LLP: (1) the Company had no disagreements with McGladrey LLP on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which disagreements, if not resolved to the satisfaction of McGladrey LLP, would have caused McGladrey LLP to make reference to the subject matter of the disagreement in connection with its reports; and (2) there were no "reportable events" (as defined in Regulation S-K Item 304(a)(1)(v)).

During the fiscal year ended December 31, 2011, and the interim period through our engagement of Ernst & Young LLP, the Company did not consult with Ernst & Young LLP regarding: (1) the application of accounting principles to a specified transaction, either proposed or completed, or the type of audit opinion that might be rendered on the Company's financial statements; or (2) any matter or reportable event set forth in Item 304(a)(1)(v) of Regulation S-K.

We provided McGladrey LLP with a copy of the foregoing disclosures and requested that McGladrey LLP provide bluebird with a letter addressed to the SEC stating whether or not McGladrey LLP agreed with disclosure contained herein. A copy of McGladrey's letter is attached to this proxy statement as Appendix I.

Independent Registered Public Accounting Firm Fees

The following is a summary and description of fees incurred by Ernst & Young LLP for the fiscal years ended December 31, 2013 and 2012.

	<u>Fiscal Year 2013</u>	<u>Percentage of 2013 Services Approved by Audit Committee</u>	<u>Fiscal Year 2012</u>	<u>Percentage of 2012 Services Approved by Audit Committee</u>
Audit fees (1)	\$ 912,600	100%	\$ 46,080	100%
Audit-related fees (2)	\$ 25,000	100%	\$ —	— %
Tax fees (3)	\$ 44,310	100%	\$ —	— %
All other fees (4)	\$ 1,995	100%	\$ —	— %
Total fees	\$ 983,905	100%	\$ 46,080	100%

- (1) Audit fees in 2013 include fees in connection with the Company's initial public offering, including registration statements, responding to SEC comment letters, comfort letters and consents, fees for our annual audit and quarterly review procedures. Audit fees in 2012 include fees related to the annual audit of the Company's financial statements.
- (2) Audit-related fees are related to accounting consultations.
- (3) Tax fees are related to tax compliance and tax advice.
- (4) All other fees are related to licensing fees paid to Ernst & Young LLP for access to its proprietary accounting research database.

THE BOARD OF DIRECTORS UNANIMOUSLY RECOMMENDS THAT YOU VOTE

FOR

THE RATIFICATION OF THE SELECTION OF ERNST & YOUNG LLP AS THE COMPANY'S INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

(PROPOSAL 2 ON YOUR PROXY CARD)

CODE OF BUSINESS CONDUCT AND ETHICS AND CORPORATE GOVERNANCE GUIDELINES

bluebird has adopted a Code of Business Conduct and Ethics for its directors, officers and employees, including its President and Chief Executive Officer, Principal Financial Officer and Controller (or persons performing an equivalent function). A copy of the Company's Code of Business Conduct and Ethics may be accessed free of charge by visiting the Company's website at www.bluebirdbio.com and going to the "Investors and Media—Corporate Governance" section or by requesting a copy in writing from Jason F. Cole, Secretary, at our Cambridge, Massachusetts office. bluebird intends to post on its website any amendment to, or waiver under, a provision of the Code of Ethics that applies to its President and Chief Executive Officer, Principal Financial Officer or Controller (or persons performing an equivalent function) within four business days following the date of such amendment or waiver.

A copy of the Corporate Governance Guidelines may also be accessed free of charge by visiting the website at www.bluebirdbio.com and going to the "Investors and Media—Corporate Governance" section or by requesting a copy from Jason F. Cole, Secretary, at our Cambridge, Massachusetts office.

POLICIES ON REPORTING OF CONCERNS REGARDING ACCOUNTING AND OTHER MATTERS AND ON COMMUNICATING WITH NON-MANAGEMENT DIRECTORS

The Board of Directors and the Audit Committee have adopted policies on reporting concerns regarding accounting and other matters and on communicating with the non-management directors. Any person, whether or not an employee, who has a concern about the conduct of bluebird, or any of its people, including with respect to accounting, internal accounting controls or auditing matters, may, in a confidential or anonymous manner, communicate that concern to the Company's Ethics Compliance Officer, who is the designated contact for these purposes. Contact may be made:

- By e-mail to ethicscomplianceofficer@bluebirdbio.com (anonymity cannot be maintained);
- In writing (which may be done anonymously as set forth below under "Anonymity"), addressed to the Ethics Compliance Officer, by U.S. mail to c/o bluebird bio, Inc., 150 Second Street, Third Floor, Cambridge, MA 02141;
- Online at <http://bluebirdbio.silentwhistle.com> (which may be done anonymously as set forth below under "Anonymity"); or
- By phoning a voicemail account that we have established for receipt of questions and reports of potential violations of the Code. The voicemail account may be reached at (800) 224-8113 and calls may be made anonymously as set forth below under "Anonymity." Any interested party, whether or not an employee, who wishes to communicate directly with the Audit Committee, also may contact the Audit Committee using one of the above methods.

STOCKHOLDER PROPOSALS

Stockholder Recommendations for Director Nominations

Any stockholder wishing to recommend a director candidate for consideration by the nominating and corporate governance committee should provide the following information to the chair of the nominating and corporate governance committee, bluebird bio, Inc., 150 Second Street, Third Floor, Cambridge, MA 02141: (a) a brief statement outlining the reasons the nominee would be an effective director for bluebird; (b) (i) the name, age, and business and residence addresses of the candidate, (ii) the principal occupation or employment of the candidate for the past five years, as well as information about any other Board of Directors and board committees on which the candidate has served during that period, (iii) the number of shares of bluebird stock, if any, beneficially owned by the candidate and (iv) details of any business or other significant relationship the candidate has ever had with bluebird; and (c) (i) the stockholder's name and record address and the name and address of the beneficial owner of bluebird shares, if any, on whose behalf the proposal is made and (ii) the number of shares of bluebird stock that the stockholder and any such other beneficial owner beneficially own.

The Committee may seek further information from or about the stockholder making the recommendation, the candidate, or any such other beneficial owner, including information about all business and other relationships between the candidate and the stockholder and between the candidate and any such other beneficial owner.

Deadlines for Stockholder Proposals and Director Nominations

Stockholders who wish to present proposals for inclusion in our proxy materials for the 2015 Annual Meeting of Stockholders may do so by following the procedures prescribed in Rule 14a-8 under the Securities Exchange Act of 1934 and in our By-laws. Our Secretary must receive stockholder proposals intended to be included in our proxy statement and form of proxy relating to our 2015 Annual Meeting of Stockholders made under Rule 14a-8 by December 25, 2014.

Under our current By-laws, proposals of business and nominations for directors other than those to be included in our proxy materials following the procedures described in Rule 14a-8 may be made by stockholders entitled to vote at the meeting if notice is timely given and if the notice contains the information required by the By-laws. To be timely a notice with respect to the 2015 Annual Meeting of Stockholders must be delivered to our Secretary no earlier than February 11, 2015 and no later than March 13, 2015, unless the date of the 2015 Annual Meeting is advanced or delayed by more than thirty (30) days from the anniversary date of the 2014 Annual Meeting, in which event the By-laws provide different notice requirements.

Any proposal of business or nomination should be mailed to: Jason F. Cole, Secretary, bluebird bio, Inc., 150 Second Street, Third Floor, Cambridge, Massachusetts 02141.

WHERE YOU CAN FIND MORE INFORMATION

bluebird files annual, quarterly and current reports, proxy statements and other information with the SEC. You may read and copy any reports, statements, or other information that bluebird files at the SEC's public reference room at the following location: 100 F Street, N.E., Washington, D.C. 20549.

Please call the SEC at 1-800-732-0330 for further information on the public reference room. The Company's SEC filings are also available to the public from commercial document retrieval services and at the website maintained by the SEC at <http://www.sec.gov>. You may also read and copy any document the Company files with the SEC on our website at <http://www.bluebirdbio.com> under the "Investors and Media" menu.

You should rely on the information contained in this document to vote your shares at the Annual Meeting. bluebird has not authorized anyone to provide you with information that is different from what is contained in this document. This document is dated April 24, 2014. You should not assume that the information contained in this document is accurate as of any date other than that date, and the mailing of this document to stockholders at any time after that date does not create an implication to the contrary. This Proxy Statement does not constitute a solicitation of a proxy in any jurisdiction where, or to or from any person to whom, it is unlawful to make such proxy solicitations in such jurisdiction.

FORM 10-K

We are subject to the informational requirements of the Securities Exchange Act of 1934, as amended, and, in accordance therewith, file reports, proxy statements and other information with the U.S. Securities and Exchange Commission. Reports, proxy statements and other information filed by us may be inspected without charge and copies obtained upon payment of prescribed fees from the Public Reference Section of the U.S. Securities and Exchange Commission at 100 F Street, NE, Washington, D.C. 20549, or by way of the U.S. Securities and Exchange Commission's website, <http://www.sec.gov>.

We will provide without charge to each person to whom a copy of the proxy statement is delivered, upon the written or oral request of any such persons, additional copies of our Annual Report on Form 10-K, as amended, for the fiscal year ended December 31, 2013 as filed with the Securities and Exchange Commission. Requests for such copies should be addressed to:

bluebird bio, Inc.

150 Second Street
Third Floor
Cambridge, Massachusetts 02141
(339) 499-9300
Attention: Jason F. Cole, Secretary

IMPORTANT NOTICE REGARDING DELIVERY OF STOCKHOLDER DOCUMENTS

Stockholders of bluebird common stock who share a single address, may receive only one copy of this Proxy Statement, Notice of Internet Availability and our Annual Report on Form 10-K for the fiscal year ended December 31, 2013, unless bluebird has received contrary instructions from any stockholder at that address. This practice, known as “householding,” is designed to reduce the Company’s printing and postage costs. However, if any stockholder residing at such an address wishes to receive a separate copy of this Proxy Statement, Notice of Internet Availability or our Annual Report on Form 10-K for the fiscal year ended December 31, 2013, he or she may contact bluebird bio, Inc., 150 Second Street, Third Floor, Cambridge, Massachusetts 02141, (339) 499-9300, Attention: Jason F. Cole, Secretary, and bluebird will deliver those documents to such stockholder promptly upon receiving the request. Any such stockholder may also contact Jason F. Cole, Secretary, using the above contact information if he or she would like to receive separate proxy statements, notice of internet availability and annual reports in the future. If you are receiving multiple copies of our annual reports, notice of internet availability and proxy statements, you may request householding in the future by contacting Jason F. Cole, Secretary.

OTHER BUSINESS

The Board of Directors knows of no business to be brought before the 2014 Annual Meeting which is not referred to in the accompanying Notice of Annual Meeting. Should any such matters be presented, the persons named in the proxy shall have the authority to take such action in regard to such matters as in their judgment seems advisable. If you hold shares through a broker, bank or other nominee as described above, they will not be able to vote your shares on any other business that comes before the 2014 Annual Meeting unless they receive instructions from you with respect to such matter.

McGladrey LLP

80 City Square
Boston, MA 02129
O 617.912.9000 F 617.912.9001
www.mcgladrey.com



April 24, 2014

Securities and Exchange Commission
Washington, D.C. 20549

Commissioners:

We have read bluebird bio's statements regarding the "Change in Principal Independent Registered Public Accounting Firm" included within its proxy statement filed on April 24, 2014 and we agree with such statements concerning our firm.

A handwritten signature in cursive script that reads "McGladrey LLP".

McGladrey LLP



VOTE BY INTERNET - www.proxyvote.com

Use the Internet to transmit your voting instructions and for electronic delivery of information up until 11:59 P.M. Eastern Time the day before the cut-off date or meeting date. Have your proxy card in hand when you access the web site and follow the instructions to obtain your records and to create an electronic voting instruction form.

ELECTRONIC DELIVERY OF FUTURE PROXY MATERIALS

If you would like to reduce the costs incurred by our company in mailing proxy materials, you can consent to receiving all future proxy statements, proxy cards and annual reports electronically via e-mail or the Internet. To sign up for electronic delivery, please follow the instructions above to vote using the Internet and, when prompted, indicate that you agree to receive or access proxy materials electronically in future years.

VOTE BY PHONE - 1-800-690-6903

Use any touch-tone telephone to transmit your voting instructions up until 11:59 P.M. Eastern Time the day before the cut-off date or meeting date. Have your proxy card in hand when you call and then follow the instructions.

VOTE BY MAIL

Mark, sign and date your proxy card and return it in the postage-paid envelope we have provided or return it to Vote Processing, c/o Broadridge, 51 Mercedes Way, Edgewood, NY 11717.

TO VOTE, MARK BLOCKS BELOW IN BLUE OR BLACK INK AS FOLLOWS:

M74843-P49327

KEEP THIS PORTION FOR YOUR RECORDS

DETACH AND RETURN THIS PORTION ONLY

THIS PROXY CARD IS VALID ONLY WHEN SIGNED AND DATED.

<p>BLUEBIRD BIO, INC.</p> <p>The Board of Directors recommends you vote FOR the following:</p> <p>1. Election of Directors</p> <p style="margin-left: 20px;">Nominees:</p> <p style="margin-left: 20px;">01) Steven Gillis</p> <p style="margin-left: 20px;">02) Nick Leschly</p> <p>The Board of Directors recommends you vote FOR the following proposal:</p> <p>2. To ratify the appointment of Ernst & Young LLP as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2014.</p> <p>NOTE: Such other business as may properly come before the meeting or any adjournment thereof.</p> <p>Please sign exactly as your name(s) appear(s) hereon. When signing as attorney, executor, administrator, or other fiduciary, please give full title as such. Joint owners should each sign personally. All holders must sign. If a corporation or partnership, please sign in full corporate or partnership name by authorized officer.</p>	<p>For All</p> <p><input type="checkbox"/></p>	<p>Withhold All</p> <p><input type="checkbox"/></p>	<p>For All Except</p> <p><input type="checkbox"/></p>	<p>To withhold authority to vote for any individual nominee, mark "For All Except" and write the number of the nominee on the line below.</p> <p>_____</p>
	<p>For</p> <p><input type="checkbox"/></p>	<p>Against</p> <p><input type="checkbox"/></p>		
<p>Signature [PLEASE SIGN WITHIN BOX]</p>	<p>Date</p>	<p>Signature (Joint Owners)</p>	<p>Date</p>	

Important Notice Regarding the Availability of Proxy Materials for the Annual Meeting:
The Notice and Proxy Statement and Form 10-K are available at www.proxyvote.com.

M74844-P49327

BLUEBIRD BIO, INC.
Annual Meeting of Stockholders
June 11, 2014, 9:00 AM EDT
This proxy is solicited by the Board of Directors

The undersigned stockholder of Bluebird Bio, Inc., a Delaware corporation (the "Company"), hereby acknowledges receipt of the Notice of 2014 Annual Meeting of Stockholders and Proxy Statement, each dated April 24, 2014, and hereby appoints Jeffrey Walsh and Jason Cole, and each of them, proxies and attorneys-in-fact, with full power of substitution to each, on behalf and in the name of the undersigned, to represent the undersigned at the 2014 Annual Meeting of Stockholders of the Company to be held at the offices of Goodwin Procter LLP, located at 53 State Street, Boston, Massachusetts on June 11, 2014, at 9:00 AM EDT, and at any adjournments or postponements thereof, and to vote all shares of Common Stock which the undersigned would be entitled to vote if then and there personally present, on the matters set forth on the reverse side.

THE SHARES REPRESENTED BY THIS PROXY WILL BE VOTED AS DIRECTED OR, IF NO DIRECTION IS GIVEN, WILL BE VOTED "FOR" THE NOMINEES LISTED IN PROPOSAL NO. 1 AND "FOR" PROPOSAL NO. 2. THE SHARES REPRESENTED BY THIS PROXY WILL BE VOTED IN THE DISCRETION OF THE PROXY HOLDER ON ANY MATTER INCIDENTAL TO THE FOREGOING OR ON ANY OTHER MATTERS THAT MAY PROPERLY COME BEFORE THE ANNUAL MEETING OR ANY ADJOURNMENT OR POSTPONEMENTS THEREOF.

Continued and to be signed on reverse side