

PROSPECTUS SUPPLEMENT
(To the Prospectus dated August 21, 2024 and Prospectus Supplement dated April 25, 2025)

BullFrog AI Holdings, Inc.

Up to \$2.0 million

Of Shares of Common Stock

This prospectus supplement (this “Prospectus Supplement No. 2”) amends and supplements certain information in our prospectus, dated August 21, 2024 (the “Base Prospectus”) and the prospectus supplement, dated April 25, 2025 (the “Prospectus Supplement No. 1”, and together with the Base Prospectus, the “ATM Prospectus”), both filed with the U.S. Securities and Exchange Commission as part of our registration statement on Form S-3 (333-281341), relating to the offer and sale of shares of our common stock, \$0.00001 par value per share, from time to time pursuant to the terms of the At-the-Market Sales Agreement, or the Sales Agreement, with BTIG, LLC, or the sales agent. This Prospectus Supplement No. 2 should be read in conjunction with the ATM Prospectus, and is qualified by reference thereto, except to the extent that the information herein amends or supersedes the information contained in the ATM Prospectus. This Prospectus Supplement No. 2 is not complete without, and may only be delivered or utilized in connection with, the ATM Prospectus, and any future amendments or supplements thereto.

Our common stock is listed on the Nasdaq Capital Market under the symbol “BFRG.” On November 6, 2025, the last reported sale price of our common stock was \$0.96 per share. As of November 6, 2025, the aggregate market value of our outstanding common stock held by non-affiliates (the “Public Float”) was approximately \$14.0 million based on 11,400,405 total shares of outstanding common stock, of which approximately 9.0 million shares were held by non-affiliates, and a price of \$1.56 per share, which was the closing price of our common stock on the Nasdaq Capital Market on October 8, 2025, the highest closing sale price of our common stock on the Nasdaq Capital Market within 60 days prior to the date of this Prospectus Supplement No. 2. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities registered in a public primary offering with a value exceeding more than one-third of our Public Float in any 12-calendar month period so long as our public float remains below \$75.0 million. We have not offered any securities pursuant to General Instruction I.B.6 of Form S-3 during the prior 12-calendar month period that ends on and includes the date of this Prospectus Supplement No. 2, other than our offering of shares of common stock pursuant to the ATM Prospectus, having an aggregate value of approximately \$2.7 million. As of November 6, 2025, one-third of the Public Float was equal to approximately \$4.7 million, leaving approximately \$2.0 million available for issuance under this Prospectus Supplement No. 2.

Sales of our common stock, if any, under this Prospectus Supplement No. 2 will be made in sales deemed to be “at the market offerings” as defined in Rule 415 promulgated under the Securities Act of 1933, as amended, or the Securities Act. The sales agent is not required to sell any specific number of securities but will act as our sales agent using commercially reasonable efforts consistent with its normal trading and sales practices, on mutually agreed terms between the sales agent and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

If our public float increases such that we may sell additional amounts of common stock in excess of the aforementioned aggregate offering price under the Sales Agreement and the registration statement and ATM Prospectus, which this Prospectus Supplement No. 2 amends, we will file another prospectus supplement prior to making such additional sales in excess of the aforementioned aggregate offering price. In the event that our public float increases above \$75.0 million, we will no longer be subject to the limit in General Instruction I.B.6 of Form S-3, and in such event, we will file another prospectus supplement prior to making additional sales above such limit.

Our business and an investment in our common stock involve significant risks. These risks are described under the caption “Risk Factors” beginning on page S-6 of Prospectus Supplement No. 1 and in the documents incorporated by reference into this prospectus supplement.

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus supplement. Any representation to the contrary is a criminal offense.

BTIG

The date of this prospectus supplement is November 7, 2025.
