

Erratum: “Computational design optimization for microfluidic magnetophoresis” [Biomicrofluidics 5, 013413 (2011)]

Brian D. Plouffe, Laura H. Lewis, and Shashi K. Murthy

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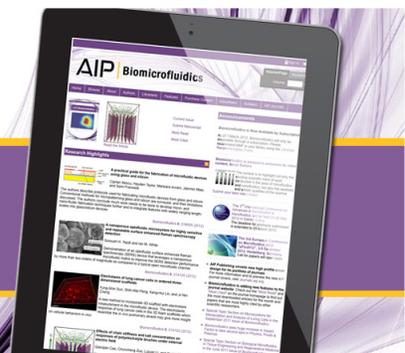
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Erratum: “Computational design optimization for microfluidic magnetophoresis” [Biomicrofluidics 5, 013413 (2011)]

Brian D. Plouffe, Laura H. Lewis, and Shashi K. Murthy^{a)}

Department of Chemical Engineering, Northeastern University, Boston, Massachusetts 02115, USA

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In a recent article in *Biomicrofluidics*¹ the authors presented the results of a computational rational design approach for a simple microfluidic device that isolates target cell populations via magnetic tagging.

Since the time of that publication, it has come to the attention of the authors that a derived equation was incorrectly reported. Equations 8(a) and 8(b) were incorrect, thus resulting in subsequent errors in Eqs. (11) and (17). Although incorrect, it was determined that the overall rational design equations utilized in the determining optimized parameters were correct and thus the reported results and conclusions are unchanged.

This erratum presents the correct Eqs. 8(a) and 8(b) and Eqs. (11) and (17). Equations 8(a) and 8(b) in Ref. 1 were originally reported as,

$$B_x = -\frac{\mu_o I z}{2\pi r r} = \frac{\mu_o I}{2\pi} \frac{z}{x^2 + z^2}$$

$$B_z = \frac{\mu_o I x}{2\pi r r} = \frac{\mu_o I}{2\pi} \frac{x^2}{x^2 + z^2}.$$

But Eqs. 8(a) and 8(b) should have been reported as,

$$B_x = -\frac{\mu_o I z}{2\pi r r} = -\frac{\mu_o I}{2\pi} \frac{z}{x^2 + z^2}$$

$$B_z = \frac{\mu_o I x}{2\pi r r} = \frac{\mu_o I}{2\pi} \frac{x}{x^2 + z^2}.$$

This error was then propagated through Eqs. (9)–(11) and (17), where Eq. (11) should have been reported as,

$$F_{m,x} = -\frac{V_p \chi_p}{\mu_o} \left[\left(\frac{\mu_o I}{2\pi} \right)^2 \frac{x}{(x^2 + z^2)^2} \right]$$

and Eq. (17) should then have been reported as,

^{a)} Author to whom correspondence should be addressed. Electronic mail: smurthy@coe.neu.edu.

$$-\frac{V_p \chi_p}{\mu_o} \left[\left(\frac{\mu_o I}{2\pi} \right)^2 \frac{x}{(x^2 + z^2)^2} \right] - 6\pi\eta R_p v_x = 0.$$

Further investigation of the subsequent equations, which built on these fundamental magnetic force calculations, illustrate that although these equations were reported incorrectly, the main design equations (Eqs. (21) and (24)) have been reported correctly and thus these errors had no influence on the resulting optimization or rational design of the magnet-based microfluidic device. In other words, all of the major conclusions drawn in this paper still stand as originally published.

¹B. D. Plouffe, L. H. Lewis, and S. K. Murthy, *Biomicrofluidics* 5(1), 013413 (2011).