In response to the queries from the editor:

Q1: The author names are correct.

Q2: The incorporation of the footnote as a reference looks good.

Q3: This reference has been updated. The correct reference is: [126] S. Song, K.D. Miller, and L.F. Abbott, “Competitive Hebbian learning through spike-timing-dependent synaptic plasticity.” Nature Neuroscience, 3:919, 2000.

Q4: The meaning is preserved, but the numeral “1” should be replaced with the word “one”.

Q5: The term “hTron” is defined at first occurrence.

Q6: Yes, it does refer to Sec. VB.

Q7: The publisher of Ref. 19 is Oxford University Press. Reference 135 is a journal article published by IEEE.

Q8: For Ref. 81, the correct journal is “Nature”, not “Nature Reviews”. For Ref. 97, the correct volume is 26 and the correct page is 035010. I think Ref. 104 is correct as is. For Ref. 134, the correct page is 1669. For Ref. 159, the correct volume is 14 and the correct page is e1002589.

Q9: The year for Ref. 99 is 2000.

Q10: This information looks correct.

Q11: Reference 105 has been updated. The correct reference is: T.E. Potok, C. Schuman, S.R. Young, R.M. Patton, F. Spedalieri, J. Liu, K.-T. Yao, G. Rose, and G. Chakma. “A study of complex deep learning networks on high performance, neuromorphic , and quantum computers.” In 2016 2nd Workshop on Machine Learning in HPC Environments. IEEE, 2016.

Q12: Reference 136 should be removed from the manuscript. The only place it was previously referenced was on line 1550 after “…intend to employ.” Reference 173 should be updated to: A.N. McCaughan, V.B. Verma, S.M. Buckley, A.N. Tait, S.W. Nam and J.M. Shainline, “An ultrahigh-impedance superconducting thermal switch for interfacing superconductors to semiconductors and optoelectronics.” arXiv, 1903:10461, 2019.

Q13: These look correct.

Further corrections based on my reading of the proof:

1: Line 19, the text reading “current bias of the neuron” should read “current bias of the synapse”

2: Line 21, the text reading “via Hebbian and anti-Hebbian” should read “via Hebbian-type”

3: Line 38, the text reading “with a complexity” should read “with complexity”

4: Line 250, the text reading “make such an adaptation” should read “make such adaptation”

5: Line 282, the text reading “insights into neuroscience” should read “insights from neuroscience”

6: Line 391, the word “digital” should be replaced with the word “binary”

7: Lines 409-410, the text “We, therefore, refer” should be replaced with the text “We refer”

8: Line 418, the text “stored in a loop” should be replaced with the text “stored in a superconducting loop”

9: Line 425, the text “fan-out” should be replaced with the text “fan out”

10: Line 436, the text “NI” should be replaced with the text “NR”

11: Line 475, “memory update” process should be replaced with “memory-update” process

12: Line 543, the text “Yet, the” should be replaced with “The”

13: Line 627, the text “bias across $J\_{\mathrm{sf}}$.” should be replaced with the text “bias across $J\_{\mathrm{sf}}$, controlled by $I\_{\mathrm{sy}}$.”

14: Line 652, the word “which” should be replaced with the word “that”

15: Line 653, the symbol “$J\_{\mathrm{nf}}$” should be replaced with the symbol “$J\_{\mathrm{th}}$”

16: Line 662, the expression “$\langle V \rangle \approx R \sqrt{I^2-I\_c^2}$” should be replaced by the “$\langle V \rangle \approx R \sqrt{I^2-I\_{\mathrm{c}}^2}$ (in the limit of an overdamped junction \cite{ka1999})”

17: Line 664, the symbol “r\_{\mathrm{sfq}}” should be replaced by the symbol “r\_{\mathrm{fq}}”

18: Line 689, the text “proportional to the sum” should read “proportional to a weighted sum”

19: Line 714, the symbol “r\_{\mathrm{sfq}}” should be replaced by the symbol “r\_{\mathrm{fq}}”

20: Line 793, the text “induced current” should read “induced parasitic current”

21: Line 796, the expression “n = 1” should be replaced by the expression “N\_{\mathrm{sy}} = 1”

22: Line 818, the text “circuits such as” should read “circuits or dendritic loops as”

23: Lines 819-821, the sentence “Implementing SI loops…related to timing.” Should be deleted

24: Line 821, the sentence beginning with “It is important…” should begin a new paragraph

25: Line 827, there should be a space between “of” and “$M\_{\mathrm{sy}}$”

26: Line 944, the text “(high-$\beta\_{\mathrm{L}}$)” should be deleted

27: Lines 958-961 should read “However, even this effect may not be problematic, resulting only in a statistical distribution of initial synaptic weights. The plasticity”

28: Lines 966-975, the paragraph reading “In addition to…as discussed in Sec. III.” Should be deleted

29: Line 993, “DI” should be “DR”

30: Lines 1002 and 1003, the text “with an nTron, the gate of which can be driven normal by one or more fluxons.” Should be replaced with “by a JJ.”

31: Line 1056, the word “more” should be deleted

32: Line 1096, “efficiency of the superconducting” should read “efficiency of superconducting”

33: Line 1114, “Hebbian and anti-Hebbian” should be deleted

34: Lines 1181 and 1182 “possibilities, as discussed in Sec. III D.” should be replaced with “possibilities.”

35: Line 1232, the text reading “200\,ns to 250\,ns).” should be replaced by “200\,ns to 250\,ns), a feature enabled by the use of dissipationless superconducting circuits.”

36: Line 1352, the text reading “an anti-Hebbian” should be replaced by “a”

37: Line 1395, “anti-Hebbian” should be deleted

38: Line 1396, the text “both the Hebbian and anti-Hebbian cases” should be replaced by “both the potentiating and depressing cases”

39: Line 1416, the word “linearly” should be deleted

40: Lines 1463-1465, the sentence reading “It is also not clear…full spike-timing-dependent plasticity.” should be replaced with the sentence “Further, making use of the arrival times is difficult with phase-change materials.”

41: Line 1468, the sentence beginning with “Synaptic weights…” should begin with “In general, synaptic weights…” and this sentence should begin a new paragraph

42: Line 1549, the numeral “1” should be replaced with the word “one”

43: Line 1563, the quotes should be removed from the word “communication”

44: Line 1588, the word “joule” should be capitalized to “Joule”. Here the word is not being used as an SI unit of measure, but rather it is referring to the individual after whom the phenomenon is named

45: Line 1593, “is, therefore, required” should be replaced with “is required”

46: Line 1666, a sentence reading “In calculating $\eta\_{\mathrm{RC}}$, we use Eq.\,\ref{eq:Nph} with $\eta\_{\mathrm{qe}} = 1$.” should be added to the end of the paragraph.

47: Line 1696, “voltage necessary for” should be replaced with “voltage for”

48: Line 1751, the text “5 $\times 5$\,\textmu m$^2$” should be replaced by “5\,\textmu m\,$\times 5$\,\textmu m”.

49: Line 1788, the text “Figs. 18(a) and 18(c)” should be replaced with “Fig.\,18”

50: Line 2002, the text “an efficiency” should be replaced with “an internal quantum efficiency”

51: Line 2021, the word “circuit” should be replaced by the word “circuits”

52: Line 2022, the word “form” should be replaced by the word “forms”

53: Line 2045, the text “this is best achieved by” should be replaced by “one way to achieve this is by”

54: Lines 2085-2086, the text “cognition has yet to be proposed.” should be replaced by “cognition without traffic-based delays has yet to be proposed.”

55: Line 2109, the text “superconducting optoelectronic networks” should read “superconducting optoelectronic networks (SOENs)”

56: Line 2147, “1 x 1 cm2” should be replaced by “1\,cm\,$\times 1$\,cm”

57: Line 2187, “as hippocampus” should be replaced by “as the hippocampus”

58: Lines 2271-2273, “$e\propto n^p$” should be replaced by “$e\propto n^{p\_T}$”

59: Lines 2292-2293, “hierarchy,which” needs a space to read “hierarchy, which”

60: Line 2357, the text “1\,$\times$\,1\,cm$^2$” should be replaced by “1\,cm $\times$ 1\,cm”

61: Line 2373, the text “1\,$\times$\,1\,cm$^2$” should be replaced by “1\,cm $\times$ 1\,cm”

62: Line 2395, the text “5\,$\times$\,5\,µm$^2$” should be replaced by “5\,µm $\times$ 5\,µm”

63: Line 2403, the text “1\,$\times$\,1\,µm$^2$” should be replaced by “1\,µm $\times$ 1\,µm”

64: Line 2447, after the sentence ending “frequency $f$.” an additional sentence should be added, reading “In Eq.\,\ref{ eq:neuronalPool\_diameter}, $v$ is the velocity of signal propagation.”

65: Line 2456, the sentence beginning “Here, we consider” should begin “We consider”

66: Line 2486, the text reading “contain 10 x 109 times” should read “contain ten billion times”

67: Line 2587, the text “1\,$\times$\,1\,cm$^2$” should be replaced by “1\,cm $\times$ 1\,cm”

68: Line 2689, subscripts “at1”, “at2”, and “at3” should be replaced by “t1”, “t2”, and “t3”, respectively

69: Line 2694, the text “35\,$\times$\,35\,µm$^2$” should be replaced by “35\,µm $\times$ 35\,µm”

70: Line 2792, equation A1, the term “rLED+ILED” should be replaced by “rLED ILED” (the plus sign should be removed)

71: Line 2848, the text “5.4\,$\times$\,5.4\,µm$^2$” should be replaced by “5.4\,µm $\times$ 5.4\,µm”

72: Line 2911, the word “digital” should be replaced by the word “binary”

73: Line 2959, this sentence should begin a new paragraph

74: Line 2960, this sentence should not begin a new paragraph

75: Line 2964, this sentence should not begin a new paragraph

76: Lines 2971 and 2972, the text “synaptic firing, Hebbian, and anti-Hebbian synaptic update” should be replaced by the text “synaptic firing and synaptic update”

77: Line 2985, the word “which” should be replaced by the word “that”

78: Line 2997, the text “synaptic firing, Hebbian, and anti-Hebbian update.” should be replaced by “synaptic firing and Hebbian update.”

79: Line 3097, the expression “Nsy-1/2” should be “Nsy1/2” (the minus sign in the exponent should be removed)

80: Line 3141, the text reading “density of the network,” should be replaced by the text “density of the network, which is proportional to $f^{-(\mu-1)}$.”

81: Line 3141, Equation D9 should be removed

Comments regarding figures:

82: Fig. 2 has minor updates, namely in part (a) a “W” has been added to the upper blue box because it is referred to in the caption, and in part (b) the label “NI” was changed to “NR” to be consistent with the text.

83: Caption to Fig. 3, the text reading “enter the synaptic integration (SI) loop” should read “enter the synaptic integration loop”, as the acronym “SI” has already been introduced

84: Fig. 5, the right y axis has been updated to “Inr” to be consistent with the rest of the text

85: Fig. 13, the label “Ispd” has been moved to a less ambiguous location

86: In the caption of Fig. 16, the word “joule” should be capitalized to “Joule” as this is a proper noun, not an SI unit

87: The caption to Fig. 25 should read “…architecture in a 5 x 5 sector…” (the word “a” should be added)

88: The caption of Fig. 26 should begin “Schematic of a physical instantiation of a neuron.” (the word “a” should be added twice)

89: In the caption to Fig. 27, “1 x 1 cm2” should be replaced by “1 cm x 1 cm”, in the usual way