Hsu, Vaia, and Trionfi Reply: The primary accomplishment of our Letter [1] is the experimental measurement of both transport and geometrical scaling within a two-phase material using conducting atomic force microscopy (C-AFM). By measuring different physical properties, and their associated critical exponents, on the same sample, the complexity underlying these systems is quantitatively investigated. The discussion presented by Balberg *et al.* in their Comment underscores the importance of this broader experimental study [2].

The system examined in the Letter [1] consists of high-aspect-ratio, pristine carbon nanofibers (PCNFs) dispersed in an insulating polyimide matrix. The results were interpreted within the framework of percolation, as conventionally done in this field, including within publications from Balberg's group and the references given in their Comment [3–5]. It is important to note that a low p_c is inherent to large aspect ratio fillers, as pointed out by Balberg as early as 1988 [6]. Experimental limitations to sample uniformity and accuracy in determining very small p values make it experimentally unfeasible to maintain a low $(p - p_c)/p_c$. For example, the references given by Balberg that studied carbon nanotube fillers use data with $(p - p_c)/p_c$ as large as 77 [4] and 7.3 [5]. Our largest $(p - p_c)/p_c$ values are within this range. We acknowledge that data from these systems might be considered as homogeneous rather than percolative, where *both* conductivity and percolation probability scale linearly with p [7]. However, even though we found that the percolation probability scales approximately as $(p - p_c)^1$, the conductivity of the same material scales with $(p - p_c)^3$. This is clearly not consistent with that predicted for a homogeneous system.

In contrast with previously published work, our measurements provided two distinct scaling parameters for the nanocomposite, and thus enabled considerations of both transport and geometrical predictions of various models. As noted [1], the exponents we obtained for the PCNF nanocomposites were not consistent with a 3D continuum percolation and thus alternative constructs must be considered. The Bethe lattice was put forth as an alternative explanation. In fact, we wrote, ''While we *cannot* conclusively say that the CNF nanocomposites form a Bethe lattice, the agreement of the two critical exponents is highly *suggestive*,'' and ''this electrical composite *likely* belongs to the same universality class as the Bethe lattice.'' In our Letter, we did not in any way claim that our experimental results represent proof of a Bethe lattice, as implied by Balberg's Comment [2]. We simply stated that our data are consistent with the Bethe lattice. The estimation of z from p_c was a minor point offered as a consistency check after assuming a Bethe lattice. We agreed that the physical interpretation of $z \sim 500$ is open to discussion, necessitating further consideration [8].

As an alternative interpretation of our results, Balberg offers the tunneling-hopping transport model [2]. While we cannot rule out such an interpretation, we would like to point out two reasons why it is also not satisfactory. First, this model is based solely on conductivity. As we pointed out in the original Letter [1], many models can explain the conductivity data, but they cannot be conclusive without a quantitative measurement of the network morphology. Since we measured $\beta \sim 1$, it seems to be contradictory to the tunneling model, which, as pointed out by Balberg, should have the same β value as the lattice percolation model ($\beta \sim 0.4$ in 3D) [6]. Second, the data and conclusion in the Letter are for PCNF in polyimide, not for functionalized carbon nanofibers (FCNF) as discussed in Balberg's Comment [2]. The impact of surface functionalization on bulk conductivity was clearly shown in Ref. [9]. While it is noted by Balberg [2] that the FCNF nanocomposite conductivity can be fitted to $\sigma = \sigma_\gamma \exp(-a_\gamma/p^\gamma)$ with $\gamma = 1/3$ as expected in the 3D tunneling model, we found $\gamma = 1$ for the PCNF nanocomposites that were the subject of the study in the Letter, which disagrees with the prediction of 3D tunneling model. We must emphasize that the Letter considers only PCNF nanocomposites.

Thus, while we agree that having data closer to the critical point is desirable for composite systems with high-aspect-ratio fillers, it is not experimentally feasible at present. Since existing experimental data pose substantial deviations from theoretical models, we stress the importance of measuring multiple physical quantities on the same samples. Our Letter provides a critical contribution towards this goal.

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