

ARTICLE

Priority monism

Kelly Trogdon 

Virginia Tech

Correspondence

Kelly Trogdon, Department of Philosophy,
223 Major Williams Hall,
220 Stanger Street, Virginia Tech,
Blacksburg, VA 24061.
Email: trogdon@vt.edu

Abstract

According to priority monism, there are many concrete entities and there is one, the cosmos, that is ontologically prior to all the others. I begin by clarifying this thesis as well as its main rival, priority atomism. I show how the disagreement between the priority monist and atomist ultimately turns on how the thesis of *concrete foundationalism* is implemented. While it's standard to interpret priority monism as being metaphysically noncontingent, I show that there are two competing, prima facie plausible conceptions of metaphysical necessity—the essence-based and law-based conceptions—on which it is reasonable to view its modal status differently. This, I suggest, is good for the priority monist—various objections to the thesis presuppose that it's metaphysically noncontingent, while there are arguments for the thesis that don't make the presupposition.

1 | PRIORITY MONISM AND ATOMISM

According to priority monism, there are many concrete entities and there is one, the cosmos, that is ontologically prior to all the others. To begin, what is ontological priority? When Schaffer (2010a) speaks of ontological priority in the context of priority monism, he means *grounding*, a notion that much has been made of recently. Let's follow Schaffer (2009a) in understanding grounding to be a binary determination relation holding between entities in general and not just facts in particular. I assume further that the relation takes pluralities of entities (e.g., the grains of sand) in its first argument place and singular entities (e.g., the heap) in its second. And I assume that grounding is irreflexive and asymmetric.¹

An entity is *complex* just in case it's a fusion of multiple entities and *simple* just in case it isn't complex. While I assume that any proper part of a concrete entity is itself concrete, it's an open question whether any ground for a concrete entity is itself concrete—the view that some concreta are grounded by abstracta rather than further concreta is coherent.² So from the fact that a concrete entity is grounded, it doesn't follow that it's grounded by concreta in particular, at least in the absence of further argument. Let's say, then, that an entity is *c-grounded* just in case it's grounded by concreta, and an entity is *c-fundamental* just in case it isn't c-grounded.³

With this terminology, we can formulate priority monism and its main rival, priority atomism, as follows:

Priority monism: there is a cosmos (the unique fusion of all concreta) that is c-fundamental, and any concrete entity numerically distinct from the cosmos is grounded by it.

Priority atomism: there are multiple atoms (simple concreta), each of which is c-fundamental, and any complex concrete entity decomposes into atoms such that the latter ground the former.

These theses so formulated stand in need of further clarification—I'll focus on five points in what follows. First, the priority monist and atomist can in principle agree about the mereological structure of concrete reality. They can agree, for example, that every complex concrete entity decomposes into atoms and that there is a cosmos. So even in the face of agreement about the part-whole relations among concreta, there is room to disagree about which entities are the c-fundamental concreta within this ordering. Where the priority atomist claims that we must look at the bottom of this mereological ordering for the c-fundamental concreta, the priority monist claims that we must instead look to the top.

Second, priority monism is silent on how concreta numerically distinct from the cosmos are related by grounding to one another, and priority atomism is silent on how concreta numerically distinct from the atoms are related by grounding to one another. For example, priority monism is compatible with the idea that some concrete wholes are grounded by their proper parts (so long as the whole in question isn't the cosmos), and priority atomism is compatible with the view that some concreta are grounded by the concrete wholes they're proper parts of (so long as the former aren't atoms). So neither thesis is committed to the idea that there is a single mereological direction to grounding between concreta. Impressionistically put, priority monism and atomism specify "endpoints" of grounding among concreta and remain silent on much else.

The third point concerns the modal status of priority monism and atomism. The priority monist and atomist endorse the following thesis:

Concrete foundationalism: any c-grounded concrete entity is grounded by c-fundamental concreta.

Not only do they think that this thesis is true, but they think that it's metaphysically necessary as well. The priority monist claims that cosmoi are the mechanisms for c-fundamentality (what plays the c-fundamentality role) across the space of metaphysically possible worlds. The idea is that in the actual world, priority monism secures the truth of concrete foundationalism, and the same goes for any metaphysically possible world. This reasoning suggests that priority monism is also if true metaphysically necessary. The priority atomist instead claims that atoms are the implementing mechanisms for c-fundamentality across the space of metaphysically possible worlds. The idea is that in the actual world, priority atomism secures the truth of concrete foundationalism, and the same goes for any metaphysically possible world. This reasoning suggests that priority atomism is also if true metaphysically necessary.⁴

Fourth, why is our focus priority monism and atomism in particular? Let a *concrete foundationalist thesis* be any thesis that aims to specify the mechanisms for c-fundamentality. There are conditions of adequacy that any concrete foundationalist thesis must meet. Extrapolating from Schaffer's (2010a) discussion, two such conditions are as follows:

The grounding condition: if a concrete foundationalist thesis says that Δ are the c-fundamental concreta, then entities among Δ should be plausible candidate grounds for the concreta not among Δ .

The parsimony condition: concrete foundationalist theses shouldn't multiply c-fundamental concreta beyond necessity.

Let a *compositional concrete foundationalist thesis* be any concrete foundationalist thesis that specifies the relevant mechanisms in mereological terms. Provided that there is a cosmos, it seems that a compositional concrete foundationalist thesis satisfies the grounding condition only if Δ —the concreta that it says are c-fundamental—are such that their fusion is the cosmos, and it satisfies the parsimony condition only if there is no proper subplurality of Δ such that their fusion is the cosmos.

Priority monism and atomism satisfy the specific mereological conditions described above. As for priority atomism, provided that every complex concrete entity decomposes into atoms, the fusion of all atoms is the cosmos, and there is no proper subplurality of the atoms whose fusion is the cosmos. As for priority monism, the fusion of the cosmos is the cosmos, and there just is no proper subplurality of the plurality consisting of the cosmos. Here we have a degenerate plurality, a plurality of one.

On the face of it, these theses are the only principled compositional concrete foundationalist theses that satisfy these constraints. For suppose that the cosmos decomposes into concreta A and B, A decomposes into concreta A_1 and A_2 ; B decomposes into concreta B_1 and B_2 ; and A_1 , A_2 , B_1 , and B_2 each decomposes into atoms. Consider the compositional concrete foundationalist thesis according to which A and B are the c-fundamental concreta. This thesis satisfies the mereological conditions described above—the fusion of A and B is the cosmos, and neither A nor B on its own is the cosmos. Nevertheless, it seems that the thesis is unprincipled—there is no obvious nonarbitrary reason to choose it over the thesis according to which A_1 , A_2 , B_1 , and B_2 are instead the c-fundamental concreta. While there are other features indicative of c-fundamentality (e.g., having your temporal evolution governed by the fundamental laws of nature—more on this feature later), it seems that mereologically intermediate concreta lack these features. The top and the bottom of the mereological ordering of concreta, by contrast, are natural places to look for c-fundamentality. So provided that some or other compositional concrete foundationalist thesis is true, we are right to focus on priority monism and atomism in particular.⁵

The fifth and final point concerns fundamentality. As is customary, let's say that an entity is *fundamental* just in case it isn't grounded *period*.⁶ Provided that there are abstracta in addition to concreta, priority monism is compatible with the cosmos not being fundamental, and priority atomism is compatible with the atoms not being fundamental. For all the former says, the cosmos is grounded by abstracta. For all the latter says, the atoms are grounded by abstracta. But given either nominalism (here understood as the thesis that there are no abstracta) or the view according to which all abstracta are grounded by concreta, we can recast priority monism and atomism in terms of the notion of fundamentality rather than c-fundamentality.⁷

2 | THE MODAL STATUS OF MONISM

In this section, I consider two competing, *prima facie* plausible conceptions of metaphysical necessity. I show that relative to these conceptions priority monism is plausibly viewed as being metaphysically contingent, and the same goes for priority atomism. If priority monism and atomism are metaphysically contingent, then the dialectic concerning these theses changes in a way that is on the whole beneficial to the priority monist. I take the latter issue up in the next section.

Before getting into the details, I should note that I'm not the first to suggest that it would be reasonable for the priority monist to "go contingent." Miller (2009) draws the same conclusion as I do below about the modal status of priority monism given Rosen's (2006) conception of metaphysical necessity, though we frame matters differently—my discussion underscores the role that essence plays in Rosen's account in a way that Miller's doesn't.⁸ Benocci (2017) and Siegel (2016) suggest that the priority monist should go contingent, but their recommendation isn't based on principled considerations about metaphysical necessity. Two objections to priority monism that I discuss in the next section are the internality of grounding and nomic objections. For Benocci, the priority monist should go contingent to avoid the former, and Siegel says the same about the latter. As will become clear in the next section, I'm sympathetic with what they say here.

2.1 | The essence-based conception

Consider the following view: a proposition is metaphysically necessary just in case it's either a logical truth, a conceptual truth, an a posteriori identity truth, an essential truth, or entailed by some combination of these truths.

Let's call this the *essence-based* conception of metaphysical necessity, as it assigns a distinctive role for essences in characterizing metaphysical necessity in addition to the usual suspects (logic, meaning, and theoretical identifications).

There is some disagreement about what form the essential truths take. To simplify our discussion, let's suppose that any essential truth characterizes either an object, property, or relation. Let's distinguish between two takes on the essential truths, the *conditional* and *latitudinarian* views.⁹ The point of departure for the conditional view is the idea that the essential truths about an entity tell us either what it is to be that entity or what it is to have (instantiate) that entity. On this view, an essential truth about an object specifies an *identity condition* for that object—it's an instance of the following schema, where the underscore can be filled with either "if," "only if," or "if and only if":

- It's essential to a that $(\forall x)(x = a _ \phi(x))$.

A potential example of a truth of this form: it's essential to the number 1 that something is the number 1 if and only if it's the successor of 0. Turning to properties and relations, the conditional view says that there are two types of essential truths about these sorts of entities. Focusing on properties, some essential truths about properties specify their identity conditions—they're instances of the following schema:

- It's essential to F that $(\forall X)(X = F _ \phi(X))$.

A potential example of a truth of this form: it's essential to *burgundy* that if something is *burgundy* then it's a property. Other essential truths about properties, by contrast, specify their *instantiation conditions*—they're instances of the following schema:

- It's essential to F that $(\forall x)(x \text{ has } F _ \phi(x))$.

A potential example of a truth of this form: it's essential to *being a set* that x is a set only if x is such that the pairing axiom is true (for any sets x and y, there is some set z that contains just x and y).

So the conditional view of essence has it that any essential truth about an entity specifies either an identity or instantiation condition for that entity. The latitudinarian view, by contrast, says that some essential truths aren't like this—they have different forms. For example, the latitudinarian but not the conditional view is compatible with there being essential truths about objects that look like this:

- It's essential to a that b exists.
- It's essential to a that F exists.
- It's essential to a that something has F.

Keeping our focus on existence but switching to essential truths about properties, the latitudinarian but not the conditional view is compatible with there being essential truths about properties that have the following form:

- It's essential to F that a exists.
- It's essential to F that G exists.
- It's essential to F that something has G.

So the latitudinarian but not the conditional view is compatible, say, with it being essential to God that God exists and it being essential to *being a number* that there are numbers. The moral is that on the latitudinarian view, essential truths are potentially existence involving in a way that is prohibited by the conditional view.

We can combine the essence-based conception of metaphysical necessity with either the conditional or latitudinarian views of essence. Rosen's (2006) conception of metaphysical necessity is the essence-based conception combined with the conditional view (or something close to the conditional view as I've characterized it). On this conception of metaphysical necessity, it seems that certain theses that are standardly taken to be metaphysically non-contingent turn out to be contingent. Consider, for example, the claim that sets exist. It's not self-contradictory or otherwise incoherent to reject the idea that there are sets, so the claim is synthetic—it's neither a conceptual nor logical truth. This claim isn't an a posteriori identity truth either. Given the conditional view, it isn't an essential truth about sets (or anything else, for that matter) that sets exist. And apparently no combination of logical truths, conceptual truths, a posteriori identity truths, and essential truths specifying identity or instantiation conditions entails that sets exist. So it seems that whether there are any sets is a metaphysically contingent matter given the conditional essence-based conception of metaphysical necessity.

Supposing that this take on metaphysical necessity is correct, what are the consequences for the modal status of priority monism and atomism? As for priority monism, it's also a synthetic thesis, and it's not an a posteriori identity truth. Given the conditional view of essence, it's not an essential truth about *being a cosmos*, *being a concrete whole*, the composition relation, or anything else that there is a cosmos. As priority monism says that there is a cosmos, it follows that the thesis isn't an essential truth. And it seems that no combination of logical truths, conceptual truths, a posteriori identity truths, and essential truths specifying identity or instantiation conditions entails priority monism.

To appreciate this last point, suppose it's essential to *being a concrete whole* that something is a concrete whole only if it grounds its proper parts. This essential truth entails the following:

- (i) If there are concrete wholes, then they ground their proper parts.

Suppose it's also essential to this property that something is a concrete whole only if it's such that universal composition is true (for any things x and y , there is some z that x and y compose). This essential truth entails the following:

- (ii) If there are concrete wholes, then universal composition is true.

The following is a conceptual truth:

- (iii) If there are concreta and universal composition is true, then there is a cosmos.

While (i)–(iii) don't entail priority monism, they do entail the following:

- (iv) If there are concrete wholes, then priority monism is true.

But on the conditional essence-based conception of metaphysical necessity, it seems that whether there are any concrete wholes is a contingent matter, just as whether there are any sets is a contingent matter. In this case, both *empty worlds*—worlds in which there are no concreta whatsoever—and *nihilistic worlds*—worlds in which there multiple concreta but no composition—are metaphysically possible.

So it seems that there is a *prima facie* plausible conception of metaphysical necessity—the conditional essence-based conception—according to which the priority monist is wrong about the modal status of her thesis. In this case, the thesis should instead be viewed as being metaphysically contingent. Similar considerations apply to priority atomism.

Moreover, it may be that priority monism and atomism are plausibly regarded as being metaphysically contingent even on the latitudinarian essence-based conception of metaphysical necessity. For to grant that some essential truths are existence-involving in the manner articulated above isn't to grant that either priority monism or atomism is plausibly regarded as being such an essential truth.

2.2 | The law-based conception

Above, I argued that on the conditional (and perhaps the latitudinarian) essence-based conception of metaphysical necessity, we need to rethink the modal status of priority monism and atomism. I think that the same may be true given the law-based conception that Rosen (2006) considers and Schaffer (2017) embraces. It's a familiar idea that a proposition is nomologically necessary just in case it's entailed by the actual laws of nature. According to the law-based conception of metaphysical necessity, we should approach metaphysical necessity in the same way—a proposition is metaphysically necessary just in case it's entailed by the actual laws of metaphysics. The metaphysical laws are thought to include general principles linking grounds to what they ground, just as the natural laws include general principles linking causes to their effects. As Rosen puts the idea, the laws of metaphysics are principles that "... specify the categories of basic constituents and the rules for their combination." And they are so as to "determine how non-basic entities are generated from or 'grounded' in the basic array" (2006, 35).¹⁰

Schaffer (2010a) claims that priority monism itself is a metaphysical law, and he sees the priority atomist as claiming that priority atomism is instead a metaphysical law. Given the law-based conception, if priority monism is a metaphysical law then it's of course metaphysically noncontingent. And if priority atomism instead is a metaphysical law then it's metaphysically noncontingent.

I'm not going to argue that it's a mistake to think of priority monism and atomism as being competing proposals about metaphysical laws. Instead, I wish to note that there is a *prima facie* plausible alternative view to consider. The idea is that, while it's true that there is a metaphysical law in the vicinity, it's neither priority monism nor atomism but instead concrete foundationalism. This, you will recall, is the thesis that any *c*-grounded concrete entity is grounded by *c*-fundamental concreta. After all, the priority monist and atomist start out with the idea that this principle is metaphysically necessary. All we need to do here is abandon the idea that there is a single type of mechanism for *c*-fundamentality across the space of metaphysically possible worlds. We can say instead that in some of these worlds *cosmoi* underlie *c*-fundamentality, while in other worlds it's atoms that play this role. In other words, the phenomenon of *c*-fundamentality among concreta is multiply realized by *cosmoi* and atoms across modal space. Perhaps priority monism and atomism initially seemed like candidate metaphysical laws because we were wrongly ascribing to them the theoretical role that concrete foundationalism plays.¹¹

It's worth noting that there is some disagreement concerning how to formulate concrete foundationalism. Intuitively speaking, the thesis is something like this: it's necessary that if the concrete realm contains a superstructure, then it contains a sparse basis for this structure as well. You might think that the best grounding-theoretic gloss of this intuitive idea is that downwardly nonterminating chains of grounding between concreta are impossible.¹² Note, however, that priority monism is compatible with the falsity of concrete foundationalism so understood. For suppose that the cosmos is *gunky*—every part of the cosmos has a proper part. Let a_1 be a proper part of the cosmos, a_2 a proper part of a_1 , a_3 a proper part of a_2 , and so on without end. And suppose that a_1 is (partially) grounded by a_2 , a_2 is (partially) grounded by a_3 , and so on without end. Provided that priority monism is true, each concrete entity in this downwardly nonterminating grounding chain is also grounded by a *c*-fundamental concrete entity—the cosmos. However we decide to formulate concrete foundationalism, we need priority monism to entail the view. This is a reason to prefer our formulation of concrete foundationalism—any *c*-grounded concrete entity is grounded by *c*-fundamental concreta—over the alternative.¹³

3 | IMPLICATIONS

Suppose that priority monism and atomism are metaphysically contingent. What implications does this have for the debate between the priority monist and atomist? I'll approach this issue by addressing how the matter effects arguments for priority monism over atomism as well as objections to the former.

Schaffer proposes several arguments in support of priority monism over atomism. Here are thumbnail sketches of his six central arguments. The gunk argument (Schaffer, 2010a): there are metaphysically possible worlds in which the

concreta are gunky—each of their parts have proper parts—which is compatible with priority monism but not atomism. The truthmaking argument (Schaffer, 2010b): with recourse to priority monism, we have a plausible story to tell about the truthmakers for negative existentials (e.g., there are no unicorns) in any metaphysically possible world. The emergence argument (Schaffer, 2010a): there are emergent properties with respect to quantum-mechanical interactions, which is compatible with priority monism but not atomism. The spacetime argument (Schaffer, 2009b): the whole of spacetime is c-fundamental given the holistic nature of the topological and geometric properties of spacetime regions, and the cosmos is identical to the whole of spacetime. The nomic argument (Schaffer, 2013): the cosmos but none of its proper parts is such that its temporal evolution is governed by the fundamental laws of nature, and anything whose evolution is so governed is c-fundamental. And the internal relatedness argument (Schaffer, 2010c): concreta aren't open to free recombination, and priority monism best explains these modal constraints.¹⁴

Supposing that priority monism and atomism are metaphysically contingent, the gunk argument is clearly out. Priority atomism being true in the actual world is compatible with there being metaphysically possible gunky worlds in which it's false. The truthmaking argument is out as well—if there is a metaphysically possible world in which priority monism is false, then the priority monist doesn't have an account of truthmaking for negative existentials in that world.

The remaining four arguments, however, are unaffected. The modal status of priority monism isn't directly relevant to the emergence, spacetime, and nomic arguments. And in the case of the internal relatedness argument, the priority monist can say that the failure of free recombination is itself metaphysically contingent, occurring at just those metaphysically possible worlds whose mechanism for c-fundamentality is the cosmos.¹⁵ So by going contingent, we are able to maintain the majority of the arguments that Schaffer has offered for priority monism over atomism.

Turning to objections to priority monism, here are thumbnail sketches of three of them. The junk objection (Bohn, 2009): structures consisting of infinite pluralities of objects, each of which is a proper part of another (junk) is metaphysically possible, and this is compatible with priority atomism but not monism. The nomic objection (Baron & Tallant, 2016): there is a metaphysically possible world *w* in which the cosmos is the fusion of two c-fundamental concreta, as their temporal evolutions are governed by different fundamental laws given that they occupy distinct *island spacetimes* with different geometric properties.¹⁶ The internality of grounding objection (Steinberg, 2015): supposing that a heap of sand is grounded by the individual grains that compose it, there is a metaphysically possible world *w* in which this heap of sand is the cosmos, and the internality of grounding requires that it be grounded by its composing grains in *w* and thus isn't c-fundamental in *w*.¹⁷

Supposing that priority monism and atomism are metaphysically contingent, none of the above objections work. Priority monism being true in the actual world is compatible with the metaphysical possibility of worlds in which it's false because there is no cosmos (the junk objection).¹⁸ And the thesis being true in the actual world is compatible with the metaphysical possibility of worlds in which it's false because there are cosmoi that aren't c-fundamental (the nomic and internality of grounding objections).

4 | CONCLUSION

Our discussion suggests that not only are there principled considerations about metaphysical necessity that suggest that priority monism is metaphysically contingent, but the priority monist has a good deal to gain and little to lose in going contingent. It's true that there are objections to priority monism that don't presuppose that the thesis is metaphysically noncontingent. Sider (2007), for example, argues that the best accounts of intrinsic properties have as a consequence that proper parts of the cosmos instantiate fundamental properties, and this is compatible with priority atomism but not monism. And there are also objections that target common elements of priority monism and atomism. deRosset (2010), for example, argues that the priority monist and atomist are both committed to an implausible principle concerning explanation, viz. the existence and features of the concrete objects alleged by common sense and abetted by science can be completely explained solely by reference to the existence and properties of other things.

But, provided that these and other objections can be overcome, it looks like priority monism understood as a metaphysically contingent thesis is in pretty good shape.¹⁹

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ENDNOTES

- ¹ See Bliss and Trogdon (2014), Clark and Liggins (2012), Correia and Schnieder (2012), Raven (2015), and Trogdon (2013) for introductions to and overviews of recent literature on grounding.
- ² See Carmichael (2016) for related discussion.
- ³ I won't take a stand here on just how to draw the distinction between the concrete and abstract or just what sorts of entities should be counted as concrete. See Cowling (2017, Ch. 2) for relevant discussion.
- ⁴ It's unclear that concrete foundationalism admits of support via valid arguments whose premises have better epistemic credentials than their conclusions. I take it that the thesis is best regarded as a reasonable starting point in theorizing about the organization of concrete reality—this is more or less Schaffer's (2010a) view.
- ⁵ In addition to displaying a mereological structure, concreta display a *topological* structure—this concrete entity is next to that one, these concreta are between those, and so on. Giberman (2015) develops a concrete foundationalist thesis that aims to characterize the c-fundamental concreta in topological rather than mereological terms.
- ⁶ For an alternative grounding-theoretic take on fundamentality, see Raven (2016). Raven argues that Schaffer's gunk argument for priority monism (something we later consider) fails given his conception of fundamentality.
- ⁷ Relevant here is the thesis of *foundationalism* according to which any grounded entity is grounded by fundamental entities. Schaffer (2010a) sketches an argument for foundationalism, and see Trogdon (Forthcoming) for a critical assessment of this argument. See also Bliss (2013) and Cameron (2008) for further discussion.
- ⁸ See also Miller (2010) for related discussion.
- ⁹ Dasgupta (2016), Kment (2014, Ch. 6) and Rosen (2006) each discuss these views, and my characterization of them draws on these discussions. The conditional/latitudinarian terminology is due to Kment and Rosen. They're sympathetic with the conditional view, while Dasgupta and Fine (1994) endorse the latitudinarian view.
- ¹⁰ For more on metaphysical laws, see Kment (2014, Ch. 6) and Wilsch (2015) and (2016).
- ¹¹ Siegel (2016) also suggests that priority monism and atomism shouldn't be understood as competing proposals about metaphysical laws. While he doesn't consider concrete foundationalism in particular, he suggests that general claims about grounding (e.g., anything whose temporal evolution is governed by the fundamental laws is c-fundamental) are candidate metaphysical laws rather than specific grounding claims (e.g., priority monism). And Benocci (2017) agrees that, while priority monism is metaphysically contingent, there are metaphysically necessary truths in the vicinity. He suggests in particular that cosmoi are individuated in part by their grounding profiles. If this is right, then, for any metaphysically possible world in which the actual cosmos exists, it has the grounding profile that it actually does. When you combine this with the priority monist's claim that the actual cosmos is c-fundamental, it follows that any metaphysically possible world in which the actual cosmos exists is a world in which it's c-fundamental.
- ¹² This is how Schaffer (2010a) seems to understand concrete foundationalism.
- ¹³ For related discussion, see Bliss (2013), Dixon (2016), Rabin and Rabern (2016), Tahko (Forthcoming), and Trogdon (Forthcoming).
- ¹⁴ There are various critical discussions of these arguments—see, for example, Brzozowski (2016) on the gunk argument, Fischer (2015) on the truthmaking argument, Bohn (2012) and Morganti (2009) on the emergence argument, Miller (2014) on the nomic argument, and Woodward (2013) and Zimmerman (Forthcoming) on the internal relatedness argument.
- ¹⁵ Thanks to Jonathan Schaffer for suggesting this last point in conversation.
- ¹⁶ Island spacetimes are spatiotemporal manifolds that aren't externally unified by any sparse external relation—see Bricker (2001) for discussion. Siegel (2016) independently offers a related objection that targets nomologically possible worlds in which the cosmos is the fusion of two causally isolated concreta.

- ¹⁷ Grounding is internal just in case if there is a metaphysically possible world in which Δ grounds A then any metaphysically possible world in which A and the entities among Δ exist is a world in which Δ grounds A. See, however, Litland (2015) for a challenge to the idea that grounding is internal.
- ¹⁸ Supposing that worlds that are both gunky and junky (hunky) are possible, what are the mechanisms for c-fundamentality in such worlds? One option is to say that there are no such mechanisms in this case. Given the law-based conception of metaphysical necessity and the idea that concrete foundationalism is a metaphysical law, the idea is that concrete foundationalism is false in hunky worlds—while hunky worlds are logically/conceptually possible, they're metaphysically impossible.
- ¹⁹ See Trogdon (2009) for a response to Sider's objection, and von Solodkoff (2012) for a response to deRosset's.

ORCID

Kelly Trogdon  <http://orcid.org/0000-0002-3402-6570>

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Kelly Trogon teaches at Virginia Tech, where he is an Assistant Professor in the Department of Philosophy. His research focuses on metaphysics and philosophy of mind, specifically grounding, explanation, and the mind/body problem. <http://www.kellytrogon.org>

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