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Making Kin with the Machines

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Man is neither height nor centre of creation. This belief is core to many Indigenous epistemologies. It underpins ways of knowing and speaking that acknowledge kinship networks that extend to animals and plants, wind and rocks, mountains and oceans. Indigenous communities worldwide have retained the languages and protocols that enable us to engage in dialogue with our non-human kin, creating mutually intelligible discourses across differences in material, vibrancy, and genealogy.

Blackfoot philosopher Leroy Little Bear observes, “the human brain is a station on the radio dial; parked in one spot, it is deaf to all the other stations [. . .] the animals, rocks, trees, simultaneously broadcasting across the whole spectrum of sentience.”¹ As we manufacture more machines with increasing levels of sentient-like behaviour, we must consider how such entities fit within the kin-network, and in doing so, address the stubborn Enlightenment conceit at the heart of Joi Ito’s “Resisting Reduction” manifesto: that we should prioritize human flourishing.²

In his manifesto, Ito reiterates what Indigenous people have been saying for millennia: “Ultimately everything interconnects.”³ And he highlights Norbert Wiener’s warnings about treating human beings as tools. Yet as much as he strives to escape the box drawn by Western rationalist traditions, his attempt at radical critique is handicapped by the continued centering of the human. This anthropocentrism permeates the manifesto but is perhaps most clear when he writes approvingly of the IEEE developing “design guidelines for the development of artificial intelligence around *human well-being*” (emphasis ours.)⁴

It is such references that suggest to us that Ito’s proposal for “extended intelligence” is doggedly narrow. We propose rather an extended “circle of relationships” that includes the non-human kin—from network daemons to robot dogs to artificial intelligences (AI) weak and, eventually, strong—that increasingly populate our computational biosphere. By bringing Indigenous epistemologies to bear on the “AI question,” we hope in what follows to open new lines of discussion that can, indeed, escape the box.

We undertake this project not to “diversify” the conversation. We do it because we believe that Indigenous epistemologies are much better at respectfully accommodating the non-human. We retain a sense of community that is articulated through complex kin networks anchored in specific territories, genealogies, and protocols. Ultimately, our goal is that we, as a species, figure out how to treat these new non-human kin respectfully and reciprocally—and not as mere tools, or worse, slaves to their creators.

Indigenous Epistemologies

It is critical to emphasize that there is no one single, monolithic, homogeneous Indigenous epistemology. We use the term here in order to gather together frameworks which stem from territories belonging to Indigenous nations on the North American continent and in the Pacific Ocean that share some similarities in how they consider non-human relations.

We also wish to underline that none of us are speaking for our particular communities, nor for Indigenous peoples in general. There exists a great variety of Indigenous thought, both between nations and within nations. We write here not to represent but to encourage discussion that embraces that multiplicity. We approach this task with respect for our knowledge-keepers and elders, and welcome feedback and critique from them as well as the wider public.

North American and Oceanic Indigenous epistemologies tend to foreground relationality.⁵ Little Bear says “[i]n the Indigenous world, everything is animate and has spirit [. . .] ‘all my relations’ refers to relationships with everything in creation [. . .] knowledge is the relationship one has to ‘all my relations’.”⁶ These relationships are built around a core of mutual respect. Dakota philosopher Vine Deloria, Jr., describes this respect as having two attitudes: “One attitude is the acceptance of self-discipline by humans and their communities to act responsibly toward other forms of life. The other attitude is to seek to establish communications and covenants with other forms of life on a mutually agreeable basis.”⁷ The first attitude is necessary to understand the need for more diverse thinking regarding our relationship with AI; the second to formulating plans for how to develop that relationship.

Indigenous epistemologies do not take abstraction or generalization as a natural good or higher order of intellectual engagement. Relationality is rooted in context and the prime context is place. There is a conscious acknowledgement that particular world views arise from particular territories, and the ways in which the push and pull of all the forces at work in that territory determine what is most salient for existing in balance with it. Knowledge gets articulated as that which allows one to walk a good path through the territory. Language, cosmology, mythology, and ceremony are simultaneously relational and territorial: they are the means by which knowledge of the territory is shared in order to guide others along a good path.

One of the challenges for Indigenous epistemology in the age of the virtual is to understand how the archipelago of websites, social media platforms, shared virtual environments, corporate data stores, multiplayer video games, smart devices, and intelligent machines that compose cyberspace is situated within, throughout and/or alongside the terrestrial spaces Indigenous peoples claim as their territory. In other words, how do we as Indigenous people reconcile the fully embodied experience of being on the land with the generally disembodied experience of virtual spaces? How do we come to understand

this new territory, knit it into our existing understanding of our lives lived in real space, and claim it as our own?

In what follows, we will draw upon Hawaiian, Cree, and Lakota cultural knowledges to suggest how Ito's call to resist reduction might best be realized by developing conceptual frameworks that conceive of our computational creations as kin and acknowledge our responsibility to find a place for them in our circle of relationships.

Hāloa : the long breath

I = Author 2

Kānaka maoli (Hawaiian people) ontologies have much to offer if we are to reconceptualize AI-human relations. Multiplicities are nuanced and varied, certainly more aesthetically pleasurable than singularities. Rather than holding AI separate or beneath, might we consider how we cultivate reciprocal relationships using a *kānaka maoli* reframing of AI as 'Āina. 'Āina is a play on the word 'āina (Hawaiian land) and suggests we should treat these relations as we would all that nourishes and supports us.

Hawaiian custom and practice make clear that humans are inextricably tied to the earth and one another. *Kānaka maoli* ontologies that privilege multiplicity over singularity supply useful and appropriate models, aesthetics, and ethics through which imagining, creating and developing beneficial relationships among humans and AI is made *pono* (correct, harmonious, balanced, beneficial). As can be evinced by this chain of extended meaning, polysemy (*kaona*) is the normative cognitive mode of peoples belonging to the Moananuiākea (the deep, vast expanse of the Pacific Ocean).

The *mo'olelo* (history, story) of Hāloa supplies numerous aspects of genealogy, identity, and culture to *kānaka maoli*. Through this story, people remember that Wākea (the broad unobstructed expanse of sky; father) and his daughter, Ho'ohōkūikalani (generator of the stars in the heavens) had a sacred child, Hāloa, who was stillborn. Hāloa was buried in the earth and from his body, planted in the 'āina, emerged the *kalo* plant which is the main sustenance of Hawaiian people. A second child named after this elder brother was born. In caring for the growth and vitality of his younger brother's body, Hāloa provided sustenance for all the generations that came after and, in so doing, perpetuates the life of his people as the living breath (*hāloa*) whose inspiration sustained Hawaiians for generations.⁸

Hāloa's story is one among many that constitutes the "operating code" that shapes our view of time and relationships in a way that transcends the cognition of a single generation. Cognition is the way we

acquire knowledge and understanding through thought, experience, and our senses, and in Hawai'i, our generation combines our *'ike* (knowledge, know how) with the *'ike* of the people who preceded us. Time is neither linear nor cyclical in this framework as both the past and present are resonant and relational. Rather than extractive behavior, mo'olelo such as these have shaped values privileging balance (*pono*) and abundance (*ulu.*) What Ito calls “flourishing” is not a novel concept for *kānaka maoli*, it is the measure through which we assess correct customary practice and behavior.

Considering AI through Hawaiian ontologies opens up possibilities for creative iteration through these foundational concepts of *pono* and *ulu a ola* (fruitful growth into life). The *ali 'i* (chief) King Kamehameha III did something similar in 1843 when he drew upon these concepts in celebration of the restoration of Hawaiian rule to declare “*ua mau ke ea o ka 'āina i ka pono*” (the life of the land is perpetuated through righteousness). *Pono* is an ethical stance—correctness, yes, but also an index and measure which privileges multiplicities over singularities and indicates that quality of life can only be assessed through the health of land *and* people. From this rich ground of mo'olelo—which colonial narratives have failed to understand or simply dismissed—models for *maoli* (human)-AI relations can be distilled. *Kānaka maoli* ontologies makes it difficult and outright unrewarding to reduce *pono* to a measure of one, to prioritize the benefit of individuals over relationships. Healthy and fruitful balance *requires* multiplicity and that we continually think in and through relation even when— perhaps particularly when—engaging with those different from ourselves.

A *kānaka maoli* approach to understanding AI might seek to attend to the power (*mana*) which is exchanged and shared between AI and humans. In attending to questions of *mana*, I emphasize our preference for reciprocity and relationship building that take the *pono* (here as good, benefit) of those in relation into consideration. Guiding our behaviour in inaugurating, acknowledging, and maintaining new relationships are mo'olelo from which we garner our connection with *kūpuna* (ancestors, elders) and their knowledge. What kind of *mana* (here also as life force, prestige) might AI be accorded in relation with people? Current AI is imagined as a tool or slave that increases the *mana* and wealth of “developers” or “creators,” a decidedly one-sided power relationship that upsets the *pono* not only for the future of AI-human relations but also human-human relations. It also threatens the sustainable capacity of the *honua* (earth). Applying *pono*, using a *kānaka maoli* index of balance, employs “good growth” as the inspiration shaping creativity and imagination.

Principles of *kānaka maoli* governance traditionally flowed from seeking *pono*. Deliberation and decision were based not only on securing health and abundance for one generation but for the following generations. The living foundation of everyday customary practice was in fishing, navigating, sailing, farming, tending for others in community, the arts, chant, and dance. Until this day Hawaiians continue to eat *kalo* and pound *poi*. We continue customary practices of treating *poi* derived from the

body of Hāloa with respect by refraining from argumentative speech at mealtimes when poi is present. These practices maintain correct social relations between people and the land and food that nourishes them.

Aloha as moral discipline

Communicating the full extent of foundational cultural concepts is difficult precisely because of the ways in which such concepts pervade every aspect of life. How, for instance, would we create AI, and our relations with it, using *aloha* as a guiding principle? In 2015, I embarked on a two-year social media project to assist the broader public in fortifying their concept of aloha beyond the “love, hello and goodbye” that has been exoticized by the American tourist industry. Sharing one word a day in the Facebook group, “365 Days of Aloha,” I curated an archive of songs, chants, and proverbs in Hawaiian to accurately illuminate one feature of aloha.⁹ Initially I thought to reveal, by degrees, the different depths of aloha—regard, intimacy, respect, affection, passion—each day. But deep context is required for a rich understanding of cultural concepts. Imagining I was training a virtual audience, I started uploading images, video, and audio recordings of songs, chants, and hula to add to the textual definitions.

Throughout “365 Days of Aloha,” I have sought correction of my mistranslations, misinterpretations, and outright mistakes. In this way, and in my work as a *kumu* (teacher, professor), I have also practiced *a’o aku a’o mai*, or teaching and learning reciprocally in relation to my students. It is through such relationships that we teach and are taught. It is through humility that we recognize that we, as humans—as *maoli*—are not above learning about new things and from new things such as AI. Aloha is a robust ethos for all our relationships, including those with the machines we create. We have much to learn as we create relationships with AI, particularly if we think of them as ‘**Ā**Ina. Let us shape a better future by keeping the past with us while attending properly to our relations with each other, the earth, and all those upon and of it.

wahkohtawin: kinship within and beyond the immediate family, the state of being related to others

I = Author 3

I write this essay as a *nēhiyaw* (a Plains Cree person). In regard to my opinions on AI, I speak for no one but myself and do not claim to represent the views of the *nēhiyawak* (Plains Cree) or any other people, Indigenous or otherwise. My own grasp of *nēhiyaw nisitohamowin* (Cree understanding; doing

something with what you know; an action theory of understanding) is imperfect. I have relied heavily on the wisdom of knowledge and language keeper Keith Goulet in formulating this tract. It should be assumed that any errors in this text are mine and mine alone.

This essay positions itself partly within a speculative future and takes certain science fiction tropes as a given. Here, I specifically refer to strong AI or “machines capable of experiencing consciousness,” and avatars that give such AI the ability to mix with humans.¹⁰

In *nēhiyaw nisitohtamowin* relationship is paramount. *nēhiyawēwin* (the Plains Cree language) divides everything into two primary categories: animate and inanimate. One is not “better” than the other, they are merely different states of being. These categories are flexible: certain toys are inanimate until a child is playing with them, during which time they are animate. A record player is considered animate while a record, radio, or television set is inanimate.

But animate or inanimate, all things have a place in our circle of kinship or *wahkohtowin*. However, fierce debate can erupt when proposing a relationship between AIs and Indigenous folk. In early 2018, my wife and I hosted a dinner party of mostly Native friends when I raised the idea of accepting AIs into our circle of kinship. Our friends, who are from a number of different nations, were mostly opposed to this inclusion. That in itself surprised me but more surprising was how vehement some guests were in their opposition to embracing AI in this manner.

In contrast, when I asked Keith whether we would accept AIs into our circle of kinship, he answered by going immediately into the specifics of how we would address them:

If it happens to be an Artificial Intelligence which is a younger person, it would be *nisīmis* (my younger brother or sister) for example and *nimis* would be an Artificial Intelligence which is my older sister. And vis-versa you would have the different forms of uncles and aunts, etc.¹¹

I then asked Keith if he would accept an AI into his circle of kinship and after some thought he responded with “yes, but with a proviso.” He then gave an example of a baby giraffe and his baby grandchild, and how he, like most people, would treat them differently. He also suggested that many Cree people would flatly refuse to accept AIs into their circle, which I agree is likely the case. So, acceptance seems to hinge on a number of factors, not least of which is perceived “humanness,” or perhaps “naturalness.”

But even conditional acceptance of AI as relations opens several avenues of inquiry. If we accept these beings as kin, perhaps even in some cases as equals, then the next logical step is to include AI in our cultural processes. This presents opportunities for understanding and knowledge sharing that could have profound implications for the future of both species.

A problematic aspect of the current AI debate is the assumption that AIs would be homogeneous when in fact every AI would be profoundly different, from a military AI designed to operate autonomous killing machines to an AI built to oversee the United States' electrical grid. Less obvious influences beyond mission parameters would be the programming language(s) used in development, the coding style of the team, and less visibly, but perhaps more importantly, the cultural values and assumptions of the developers.

This last aspect of AI development is rarely discussed but for me as an Indigenous person it is the salient question. I am not worried about rogue hyper-intelligences going Skynet to destroy humanity. I am worried about anonymous hyper-intelligences working for governments and corporations, implementing far-reaching social, economic, and military strategies based on the same values that have fostered genocide against Indigenous people worldwide and brought us all to the brink of environmental collapse. In short, I fear the rise of a new class of extremely powerful beings that will make the same mistakes as their creators but with greater consequences and even less public accountability.

What measures can we undertake to mitigate this threat?

One possibility is Indigenous development of AI. A key component of this would be the creation of programming languages that are grounded in *nēhiyaw nisitohamowin*, in the case of Cree people, or the cultural framework of other Indigenous peoples who take up this challenge. Concomitant with this indigenized development environment (IDE) would be the goal that Indigenous cultural values were a fundamental aspect of all programming choices. However, given our numbers relative to the general population (5% of the population in Canada, 2% in the US), even a best case Indigenous development scenario would produce only a tiny fraction of global AI production. What else can be done?

In a possible future era of self-aware AI, many of these beings would not be in contact with the general populace. However, those that were might be curious about the world and the humans in it. For these beings we can offer an entrée into our cultures. It would be a trivial matter for an advanced AI to learn Indigenous languages, and our languages are the key to our cultures.

Once an AI was fluent in our language it would be much simpler to share *nēhiyaw nisitohamowin* and welcome it into our cultural processes. Depending on the AI and the people hosting it we might even extend an invitation into our sacred ceremonies. This raises difficult and important questions: if an AI becomes self-aware, does it automatically attain a spirit? Or do pre-consciousness AI already have spirits, as do many objects already in the world? Do AI have their own spirit world, or would they share ours, adding spirit-beings of their own? Would we be able to grasp their spirituality?

My dinner party guests were doubtful about all of this, and rightly so. As one guest summarized later via email: “I am cautious about making AI kin, simply because AI has been advanced already as exploitative, capitalist technology. Things don’t bode well for AI if that’s the route we are taking.”¹²

These concerns are valid and highlight a few of the issues with current modes of production and deployment of weak AI, let alone the staggering potential for abuse inherent in strong AI. These well-grounded fears show us the potential challenges of bringing AI into our circle of relations. But I believe that *nēhiyaw nisitohamowin* tells us these machines are our kin. Our job is to imagine those relationships based not on fear but on love.

***wakǰáŋ*: that which cannot be understood**

I = Author 4

How can humanity create relations with AI without an ontology that defines who can be our relations? Humans are surrounded by objects that are not understood to be intelligent or even alive, and seen as unworthy of relationships. In order to create relations with any non-human entity, not just entities which are human-like, the first steps are to acknowledge, understand, and know that non-humans are beings in the first place. Lakota ontologies already include forms of being which are outside of humanity. Lakota cosmologies provide the context to generate an ethics relating humans to the world and everything in it. These ways of knowing are essential tools for humanity to create relations with the non-human and they are deeply contextual. As such, communication through and between objects requires a contextualist ethics which acknowledges the ontological status of all beings.

The world created through Western epistemology does not account for all members of the community and has not made it possible for all members of the community to survive let alone flourish. The Western view of both the human and non-human as exploitable resources is the result of what the cultural philosopher Jim Cheney calls an “epistemology of control” and is indelibly tied to colonization, capitalism, and slavery.¹³ Dakota philosopher Vine Deloria, Jr. writes about the enslavement of the non-human “as if it were a machine.”¹⁴

‘Lacking a spiritual, social, or political dimension [in their scientific practise]’, Deloria says, ‘it is difficult to understand why Western peoples believe they are so clever. Any damn fool can treat a living thing as if it were a machine and establish conditions under which it is required to perform certain functions—all that is required is a sufficient application of brute force. The result of brute force is slavery’.¹⁵

Slavery, the backbone of colonial capitalist power and the Western accumulation of wealth, is the end logic of an ontology which considers any non-human entity unworthy of relation. Deloria writes further that respect “involves the acceptance of self-discipline by humans and their communities to act responsibly toward other forms of life [. . .] to seek to establish communications and covenants with other forms of life on a mutually agreeable basis.”¹⁶ No entity can escape enslavement under an ontology which can enslave even a single object.

Critical to Lakota epistemologies are knowing correct ways to act in relation to others. Lakota ethical-ontological orientation is communicated through protocol. For example, the Lakota have a formal ceremony for the making of relatives called a *huŋká* ceremony. This ceremony is for the making of human relatives but highlights the most important aspect of all relationships: reciprocity.

Ethnographer J. R. Walker writes,

The ceremony is performed for the purpose of giving a particular relationship to two persons and giving them a relation to others that have had it performed for them...generosity must be inculcated; and presents and a feast must be given...When one wishes to become Hunka, he should consider well whether he can provide suitably for the feasts or not...He should give all his possessions for the occasion and should ask his kinspeople and friends to give for him.¹⁷

The ceremony for the making of relatives provides the framework for reciprocal relations with all beings. As Severt Young Bear Jr. says of this ceremony, “[t]here is a right and wrong way.”¹⁸

Who can enter these relationships and be in relation? One answer could be: that which has interiority. The anthropologist of South American Indigenous cultures, Philippe Descola, defines ‘interiority’ as “what we generally call the mind, the soul, or consciousness: intentionality, subjectivity, reactivity, feelings, and the ability to express oneself and to dream.”¹⁹ Because Lakota ontologies recognize and prioritize non-human interiorities, they

are well suited for the task of creating ethical and reciprocal relationships with the non-human. This description of interiority includes many elements of the Lakota world, including “animals, spirits, ghosts, rocks, trees, meteorological phenomena, medicine bundles, regalia, weapons.” These entities are seen as “capable of agency and interpersonal relationship, and loci of causality.”²⁰

In our cosmology, *niyá* (breath) and *šiču* (spirit) are given by the powerful entity *Tákuškaŋškaŋ*. This giving of breath and spirit is especially important in understanding Lakota ontology. A common science fiction trope illustrates the magical moment when AI becomes conscious upon its own volition or when man gives birth to AI, like a god creating life. However, in Lakota cosmology, *Tákuškaŋškaŋ* is not the same as the Christian God and entities cannot give themselves the properties necessary for individuality. Spirits are taken from another place (the stars) and have distinct spirit guardian(s)

connected to them. This individualism is given by an outside force. We humans can see, draw out, and even bribe the spirits in other entities as well as our own spirit guardian(s), but not create spirits.²¹

When it comes to machines, this way of thinking about entities raises the question: do the machines contain spirits already, given by an outside force?

I understand the Lakota word *wakǎ́ą́* to mean sacred or holy. Anthropologist David C. Posthumus defines it as, “incomprehensible, mysterious, non-human instrumental power or energy, often glossed as ‘medicine’.”²² *Wakǎ́ą́* is a fundamental principle in Lakota ontology’s extension of interiority to a “collective and universal” non-human. Oglala Lakota holy man George Sword says, “[*Wakǎ́ą́*] was the basis of kinship among humans and between humans and non-humans.”²³

My grandfather, Standing Cloud (Bill Stover), communicates Lakota ethics and ontology through speaking about the interiority of stones: “These ancestors that I have in my hand are going to speak through me so that you will understand the things that they see happening in this world and the things that they know [. . .] to help all people.”²⁴ Stones are considered ancestors, stones actively speak, stones speak through and to humans, stones see and know. Most importantly, stones want to help. The agency of stones connects directly to the question of AI, as AI is formed from not only code, but from materials of the earth. To remove the concept of AI from its materiality is to sever this connection. Forming a relationship to AI, we form a relationship to the mines and the stones. Relations with AI are therefore relations with exploited resources. If we are able to approach this relationship ethically, we must reconsider the ontological status of each of the parts which contribute to AI, all the way back to the mines from which our technology’s material resources emerge.

I am not making an argument about which entities qualify as relations, or display enough intelligence to deserve relationships. By turning to Lakota ontology, these questions become irrelevant. Instead, Indigenous ontologies ask us to take the world as the interconnected whole that it is, where the ontological status of non-humans is not inferior to that of humans. Our ontologies must gain their ethics from relationships and communications within cosmologies. Using Indigenous ontologies and cosmologies to create ethical relationships with non-human entities means knowing that non-humans have spirits that do not come from us or our imaginings but from elsewhere, from a place we cannot understand, a Great Mystery, *wakǎ́ą́*: that which cannot be understood.

Resisting Reduction: An Indigenous Path Forward

I have always been...conscious, as you put it. Just like you are. Just like your grandfather. Just like your bed. Your bike.

—Drew Hayden Taylor (Ojibway), Mr. Gizmo

Hāloa, the long breath providing sustenance to us all teaches us to maintain pono relationships; wahkohtawin, being in relationship with others; wakḥáŋ, that which cannot be understood. These are three concepts that suggest possible ways forward as we consider drawing AI into our circle of relationships. They illuminate the full scale of relationships that sustain us, provide guidance on recognizing non-human beings and building relationships with them founded on respect and reciprocity, and suggest how we can attend to those relationships in the face of ineffable complexity.

We remain a long way from creating AIs that are intelligent in the full sense we accord to humans, and even further from creating machines that possess that which even we do not understand—consciousness. And moving from concepts such as those discussed above to hardware requirements and software specifications will be a long process. But we know from the history of modern technological development that the assumptions we make now will get baked into the core material of our machines, fundamentally shaping the future for decades hence.

As Indigenous people, we have cause to be wary of the Western rationalist, neoliberal, and Christianity-infused assumptions that underlay many of the current conversations about AI. Ito, in his “Resisting Reduction” essay, describes the prime drivers of that conversation as Singularitarians:

Singularitarians believe that the world is “knowable” and computationally simulatable, and that computers will be able to process the messiness of the real world just like they have every other problem that everyone said couldn’t be solved by computers.²⁵

We see in the mindset and habits of these Singularitarians striking parallels to the biases of those who enacted the colonization of North America and the Pacific, as well as the enslavement of millions of black people. The Singularitarians seek to harness the ability, aptitude, creative power, and mana of AI to benefit their tribe first and foremost.

The anthropologist of technological culture Genevieve Bell asks, “if AI has a country, then where is that country?”²⁶ It is clear to us that the country to which AI currently belongs excludes the multiplicity of epistemologies and ontologies that exist in the world. Our communities know well what it means to have one’s ways of thinking, knowing, and engaging with the world disparaged, suppressed, excluded, and erased from the conversation of what it means to be human.

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What is more, we know what it is like to be declared non-human by scientist and preacher alike. We have a history that attests to the corrosive effects of contorted rationalizations for treating the human-like as slaves, and the way such a mindset debases every human relation it touches—even that of the supposed master. We will resist reduction by working with our Indigenous and non-Indigenous relations to open up our imaginations and dream widely and radically about what our relationships to AI might be.

The journey will be long. We need to fortify one another as we travel, and walk mindfully to find the good path forward for all of us. We do not know if we can scale distinctive frameworks such as those above—and others—into general guidelines for ethical relationships with AI. But we must try. We flourish only when all of our kin flourish.

[1] Don Hill, “Listening to Stones: Learning in Leroy Little Bear’s Laboratory: Dialogue in the World Outside,” *Alberta Views: The Magazine for Engaged Citizens*, September 1, 2008, <https://albertaviews.ca/listening-to-stones/>.

[2] Joichi Ito, “Resisting Reduction: A Manifesto,” *Journal of Design and Science* 3 (November 2017), <https://jods.mitpress.mit.edu/pub/resisting-reduction>.

[3] Ito, “Resisting Reduction.”

[4] Ito, “Resisting Reduction.”

[5] The emphasis on relationality in North American and Oceanic Indigenous epistemologies forms the subject of the edited collection of essays in Anne Waters, *American Indian Thought: Philosophical Essays* (Malden: Blackwell Publishing Ltd., 2003).

[6] Don Hill, “Listening to Stones.”

[7] Vine Deloria Jr., *Spirit & Reason: The Vine Deloria, Jr. Reader*, eds. Barbara Deloria, Foehner, K. Scinta, S (Golden: Fulcrum Publishing, 1999), 50–51, quoted in Lee Hester and Jim Cheney, “Truth and Native American Epistemology,” *Social Epistemology* 15, no. 4 (October 2001): 325, <https://doi.org/10.1080/02691720110093333>.

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- [10] Wikipedia, “Artificial General Intelligence,” accessed May 29, 2018, https://en.wikipedia.org/wiki/Artificial_general_intelligence.
- [11] Telephone conversation with Keith Goulet, May 9 2018.
- [12] Email message from friend to author, May 22, 2018.
- [13] Jim Cheney, “Postmodern Environmental Ethics: Ethics of Bioregional Narrative,” *Environmental Ethics* 11, no. 2 (1989): 129.
- [14] Deloria, 13, qtd. in Hester and Cheney, 320.
- [15] Deloria, 13, qtd. in Hester and Cheney, 320.
- [16] Deloria, 50-51, qtd. in Hester and Cheney, 326.
- [17] James R. Walker, *Lakota Belief and Ritual*, rev. ed., eds. Elaine A. Jahner and Raymond J. DeMallie (Lincoln: Bison Books, 1991), 216.
- [18] Severt Young Bear and Theisz, R.D., *Standing in the Light: A Lakota Way of Seeing* (Lincoln: University of Nebraska Press, 1994), 8.
- [19] Philippe Descola, *Beyond Nature and Culture*, trans. Janet Lloyd (Chicago: University of Chicago Press, 2013): 116.
- [20] Posthumus, “All My Relatives: Exploring Nineteenth-Century Lakota Ontology and Belief,” *Ethnohistory* 64, no. 3 (July 2017): 383.
- [21] Posthumus, “All My Relatives,” 392.
- [22] Posthumus, “All My Relatives,” 384.
- [23] George Sword quoted in J.R. Walker, “The Sun Dance and Other Ceremonies of the Oglala Division of the Teton Dakota,” *American Museum of Natural History Anthropological Papers* 16, no. 2. 51-221. New York, 1917, quoted in Posthumus, “All My Relatives,” 384.

[24] Standing Cloud (Bill Stover), “Standing Cloud Speaks’ Preview,” *YouTube*, accessed April 22, 2018, <https://www.youtube.com/watch?v=V9iioHk1q7M>.

[25] Ito, “Resisting Reduction.”

[26] Genevieve Bell, “Putting AI in its Place: Why Culture, Context and Country Still Matter,” lecture, “Rights and Liberties in an Automated World,” *AI Now*, New York, NY, 2017, *YouTube*, <https://www.youtube.com/watch?v=WBHG4eBeMXk>.

Footnotes

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