

**STANDING FOR UNČI MAKȦ (GRANDMOTHER EARTH) AND ALL LIFE:
AN INTRODUCTION TO LAKOTA TRADITIONAL SCIENCES,
PRINCIPLES AND PROTOCOLS AND THE BIRTH OF A NEW
ERA OF SCIENTIFIC COLLABORATION**

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TABLE OF CONTENTS

	Page
List of Figures.....	iv
Abstract, <i>Aiyačín</i> , Key Words.....	v
Preface and Acknowledgments.....	vi
1. WIYOKPIYATAKIYA (Facing to the West).....	1
Introduction.....	1
Difficulty with Defining Terms.....	1
Current Pressures within Scientific Systems.....	2
Who are the <i>Lakota</i> ?.....	3
Challenges with Regard to Language.....	3
Challenges in Communicating Conceptually and Historically.....	4
Time to Respectfully Bring Traditional Knowledge Forward.....	5
2. WAZIYATAKIA (Facing to the North).....	7
Welcome to our Scientific World.....	7
The Application of our Sciences.....	10
Cross-Cultural Assumptions.....	11
<i>Mitakuye Oyasiñ</i> : A Lakota Science Foundational Principle.....	11
<i>Škaŋ</i> : Multi-Dimensional Worlds in Constant Motion.....	12
Calculations for Life within <i>Škaŋ</i>	13
3. WIYOHYAMPATAKIYA (Facing to the East).....	17
The Territory we Protect.....	17
A <i>Lakota</i> Perspective Regarding Western Origin Theories.....	17
Obstacles to Practicing our Sciences.....	19
A Path Forward for Research in the Americas.....	20
4. ITOGATAKIYA (Facing to the South).....	21
Research on the Horse in the Americas.....	21
The Effect of Colonization.....	23
The Effect of the Practice of our Scientific Systems on our Lands.....	24
Conclusion.....	25
REFERENCES CITED.....	27

FIGURES

	Page
1. <i>Lakota</i> Foundational Scientific Principles Tipi-model.....	8
2. <i>Lakota</i> explanation of <i>Mitakuye Oyasin</i> in <i>Lakota</i> language and translated as closely as possible into English.....	12
3. Map of North America, showing the extent of <i>Očeti Šakowin</i> presence, linguistic base, intermarriage, and co-management of lands in yellow.....	18
4. Explanation of the <i>Lakota</i> relationship with the horse in the <i>Lakota</i> language, with the closest English translation possible.....	22

Abstract: *Lakota* science and scientific systems were communally developed over thousands of years with sustainability, alignment, and ecological balance as the goals. *Lakota* knowledge keepers, traditional leaders, and scholars offer an introduction to *Lakota* scientific systems, principles, and protocols to stimulate a much needed dialogue between Indigenous scientists and the mainstream scientific, economic, and political communities. As is customary protocol-wise, the *Lakota* always follow *Šungwakan*, the Horse Nation. Here, the *Lakota* provide narrative correction with regard to their relationship with *Šungwakan*, their history, sciences, perspectives, scientific systems, and clarification regarding their sacred commitment to protect *Unči Maka* (Grandmother Earth) and all life. A case is made for the birthing of a new, truly collaborative era for science that is based upon equality and mutual respect, fully embracing the contributions and concepts of unique scientific systems. With climate change upon us, the world can no longer afford to have Indigenous scientific systems suppressed or their voices actively ignored and silenced within science and academia. There is only one Earth, and she is calling out for us to come together for the protection of all life. *Mitakuye Oyasiñ*.

Aiyačĩñ: *Lakota ehankihan woyake. Tanka ki lechel oyakapi yelo. Taku škañ škañ, petawan shahigni na taku škañ škañ iglush ake. Hetan o uwo nunpa ichage. Taku wakañ wa a upelo. Tatanka oyate ki a upelo, winyañ wan oha a upelo. Šungwakan oyate ki a upelo. Čanupa wan oha a upelo. Wamakaskan sitomniya a upelo. Wičo ichage hechupelo. Anpo wi omakiyayo. Wiyoyanpa takiya, itokaga takiya, wimaheliye takiya. Waziya takiya, mahpiya takiya na unči maka anagopta yunke. Očoka wan yuha el luta ke ki. Wičoni wan yuha manitelo. Wowableze waste luhaktelo. Čante t'izan na wowan unsila, čante oyagnaki yelo. Anpetu wanjin sunkaka wanjin unsinilaki. Waste ki he e yelo. Mitakuye Oyasiñ.*

Keywords: *Lakota* Science, climate change, sustainability, scientific collaboration, Indigenous, traditional knowledge, Horse Nation, historical narrative correction, *Unči Maka* (Grandmother Earth), origin theories, *Pte Oyate*, *Očeti Sakowiñ*, *Skañ*, *Mitakuye Oyasiñ*, protection of life.

PREFACE AND ACKNOWLEDGMENTS

Wakan Tanka, Taku Nitawa, Ohinniyan. Na Wakan, Na Ota. Mitakuye Oyasiñ.

Translated as closely as possible into English by *Anpetu Luta Wiñ* (Dr. Antonia Loretta Afraid of Bear-Cook) as follows: “Great Mystery, everything of life belongs to you for all time immemorial. Forever sacred and always abundant. All my relations.”



“We have existed with the horse since time immemorial. The horse originated in our lands and from there, Creator gifted it to the world” (*Mila Hunska Tašunke Icu Nača* [Joseph American Horse], personal communication 2022).

Culturally as *Lakota*, we always follow *Šungwakan*, the Horse Nation. Fittingly, this publication arose through such a path. The *Lakota* authors who created this paper serve as a Traditional Internal Review Committee and representative scholar for a scientific research collaboration between our *Oyate* (People), The Centre for Anthropobiology and Genomics of Toulouse (CAGT), the French Centre for Scientific Research (CNRS), the Université Paul Sabatier (Toulouse, France), The University of Colorado at Boulder, other First Nation scholars, and contributors from other scientific institutes and universities around the world.

It is a mutual commitment to *Šungwakan* that created this international scientific collaboration. As the *Lakota* Review Committee for this research endeavor, we determined that there is a lack of accurate published material regarding our scientific systems, which are necessary background for us to begin a timely, meaningful, and much needed global conversation. The ultimate goal is the birth of a new, truly collaborative era in science with the power to address the environmental and ecological challenges occurring today. We have also made the decision to publish this piece in this manner to ensure that we have clear rights to this work, as we hold, nurture, and caretake knowledge on behalf of the *Oyate*. Therefore, no peer-reviewed journal should have rights or decision-making power in editing what belongs to our *Oyate* and our future generations.

We wish to acknowledge *Tunkašila*, *Unči Maka*, and all of her lifeforms and *Pte Ska Wiñ. Wopila Tanka* for providing everything we need to walk the good road and entrusting us with the caretaking of this knowledge to carry forward for all life. We also wish to thank *Šungwakan*, the Horse Nation, for providing us with the direction and healing we need to find our way home. *Wopila* to all of our relatives who have come before us who have served as caretakers for traditional knowledge and for life, and to our relatives to come for the next seven generations and beyond. A special mention to Dr. Leonard Little Finger, Dr. Elgin Bad Wound, and Theresa Two Bulls. We honor your vision and will carry your work forward.

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Pilamaya,
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Chapter 1

WIYOKPIYATAKIYA (Facing to the West)

Introduction

We have chosen to introduce our sciences to the world at this time, in a manner aligned with our *Lakota* protocols, because *Unči Maka*, Grandmother Earth, is crying and the life she sustains is feeling the effects of her pain. *Unči Maka* is sensitive. What happens in one part of the world can be felt in another. Our human-made political borders do not reflect this reality, and they will not stand the test of time. It has become clear for all to see that *Unči Maka*'s systems are no longer in balance. This imbalance can be directly attributed to the current dominant culture's worldview, approach, and actions.

Our research has shown us that Indigenous sciences and foundational principles have the power to heal and rebalance in this world, as well as to address serious illness (Cajete 2000; Deloria 2006; Koithan and Farrell 2010). Our intent is to open a pathway that would allow for this knowledge and understanding to safely and respectfully be introduced—or in some cases reintroduced—to the world through science. There are many Indigenous Peoples who have highly advanced knowledge systems and sciences that can benefit the world greatly at this time. Our intention is to pave a way for this conversation to begin, and to support all similar efforts should any other such Nations and Peoples wish to do so. The purpose of this, from our perspective, is not to argue justification of our sciences, methodologies, methods, or lifeways, for as a sovereign People we do not have to do so. Rather, it is to allow for the juxtaposition of our scientific systems. This is not for our immediate, personal benefit or to declare one system superior or another deficient, but to help to preserve life itself on *Unči Maka*. In order to accomplish this, it is important for us and all Indigenous Peoples to be provided a safe path to bring our advanced scientific systems forward. As one of our *Očeti Šakowiŋ* (Seven Council Fires) leaders *Tatánka Íyotake*, known by many around the world as “Sitting Bull,” famously said, “Let us put our minds together and see what life we can make for our children.”

Difficulty Defining Terms

We wish to address upfront our use of general terms such as “Western” and “European” when describing the dominant system within which science is understood today in academia or the framework within which scientists must work. Our intent is not to generalize or to offend, but to refer to a mindset and perspective. We will try to use “mainstream” to describe this where possible. We also wish to acknowledge the inadequacy of terms such as “Indigenous” and “Native” when describing Peoples original to the continent of North America, as these labels are also inadequate. Due to colonization, these terms often cause pain, confusion, and discomfort. We simply do not have another way in which to refer to the concepts these terms represent in the English language that are universally respectful. It is our hope, and indeed our expectation, that in time there will be no need for a division between Western and Indigenous sciences. If we can begin to truly

understand each other, bring mutual respect forward, shine a light on each of the areas that have historically created a divide, and develop a collaborative model that can help both sides work together in an authentic, equally respectful manner, such division no longer needs to be a part of our scientific future. Such a result is completely aligned with *Lakota* scientific principles and constructs.

Current Pressures within Scientific Systems

From our perspective, we can see the difficulties with which mainstream scientists and institutes are faced. The pressures inherent within the current peer-review system are heavy, as is indicated by the responses some scientists have exhibited (Resnik and Smith 2020; Smith 2022). Despite sincere attempts, the peer-review process is not flawless (Bohannon 2013; Callaway 2015). In addition, innovative ideas that by design challenge the main scientific paradigm are difficult to get funded and ultimately supported. Western scientists must also make assumptions regarding the validity of prior published and accepted research as foundational for their own work and conclusions. There is also constant pressure upon scientists and researchers to publish in order to validate their work and qualify for academic promotion and future funding (Triggle and Triggle 2010). Finally, science publications and journals have the power to reject, edit, and shape all work that is submitted to them, often resulting in narratives that are so condensed that they are not understandable by non-experts. The effectiveness of these processes depend upon the politics of the time, and the judgment and pressures experienced by those in positions of power. For us, as *Lakota*, to overlook these realities would be unfair to researchers within the current academic construct for Western science.

Indeed, contrary to what is put forth in the majority of literature that has been written about the *Lakota*, our scientists also experience a rigorous peer-review system. Traditionally, our peer-review system is “character-based.” Our scientists must train ceremonially throughout their lifetimes, usually beginning when they are very young (DeMallie and Jahner 1980). Throughout these personal trials and societal tests, the community observes their character and conduct carefully. Only those individuals who have deep, first-person experience with a topic or field of study are permitted to address the community regarding this issue. Everyone is welcome to listen, participate, and learn. However, only those who have exhibited true mastery of a subject or field of study and who conduct themselves in a manner aligned with our most important societal values (*wowačįntaŋka*, fortitude; *wačąntognaka*, generosity; *wótakuye*, kinship; *wóčekiya*, prayer; *waóhola*, respect; *wóksape*, wisdom; and *wówaunšila*, compassion) will be considered a leader and asked to speak or teach about the issue on behalf of the *Oyate*. In essence, we speak about that which we have genuinely experienced across all realms. This is done to eliminate the harm caused by uninformed interpretation or the potential for manipulation. What might change and be additive to science, overall, if our systems were to be respectfully shared and utilized to help bring this world into balance?

Who Are the *Lakota*?

The *Lakota Oyate* are part of the *Pte Oyate*, or the Buffalo Nation. Together, with our *Dakota* and *Nakota* relatives, we form the *Očeti Šakowin* (Seven Council Fires.) Our elder knowledge keepers have documented that we have existed in our lands since time immemorial and that we have done so alongside *Šungwakan*, the Horse Nation. We understand that our concept of “time immemorial” is difficult to measure accurately with the Western technology and scientific systems available today. We will describe what this concept means, practically speaking.

Maka Onašpe’ Unkitawapi, the land that is referred to today as North America, is our home. As *Lakota*, we know how the lands and life forms have evolved over time and our role in that sphere of life. We have loved, nurtured, and specifically developed advanced scientific systems to care for the life within and around us. These systems were taught to us through our observation of and experience with *Taku Škan Škan* and *Wo’ope*, the sacred movement, great vibration and Mother Law (or “Mother Nature”), and all her lifeforms, the winged nations, four-legged nations, fish nations and plant nations. We have allies and relatives in every part of *Maka Onašpe’ Unkitawapi*. We know our relative *Šungwakan*, the Horse Nation. We know *Šungwakan*’s story, evolution and lifeways.

Challenges with Regard to Language

The majority of our *Lakota* scientific principles do not have direct English language translations. Indeed, our language was not primarily a written language. This is not because we were primitive and could not write. Rather, it was because we valued the energetic exchange that is present in face-to-face communication. It was also critical for us to be able to access the character and integrity of the person delivering the message, rather than simply accepting their message as fact. For purposes of communication in this paper, a collective decision was made to present our *Lakota* language words stylistically in a way that would allow for more effective communication with the younger generation of *Lakota* language speakers, who in many cases have learned or are learning *Lakota* as a second language in Western-formatted curriculum rather than naturally within our community. This forced shift in teaching and learning style is a direct result of the governmental assimilation and boarding school policies that were instituted across North America beginning in the mid-1800s (Woolford 2015), combined with our resilience and determination not to lose that which makes us *Lakota*. In certain instances within this work, however, we utilize a more traditional, natural language flow with fewer grammatical breaks to respect the energetic scientific principles surrounding the concepts being expressed.

In order to begin this process, we will utilize our *Lakota* language’s expressed scientific principles and create our own explanation of these expressions translated as closely as possible into English, as well as attempt to find the closest Western scientific principles for explanatory purposes. This is the beginning of us being able to bring our own narrative forward in scientific academia. We will work hard to teach and inform where possible within our guiding principles, scientific constructs, and protocols. It took our *Oyate* thousands of years of managing and observing life over vast territories that encompassed very different climatic conditions—from the arctic to the tropics—to come to this knowledge and understanding. We created alliances with other nations

along this journey, and even met some Peoples whose life ways were simply too different for us to connect with in this way. However, each of these relationships and interactions contributed to and informed the development of these processes.

Challenges in Communicating Conceptually and Historically

The *Lakota Oyate* work with and utilize concepts, practices, and manifestations of physics, mathematics, and science that have not yet been realized or documented in the Western world despite their consistency, reliability, and efficacy in application over vast periods of time by our Peoples. We have suffered a long history in the United States and Canada of being persecuted for using our language, medicines, and sciences and practicing our lifeways as a matter of American and Canadian law and practice (Collin 2017). Due to these circumstances, our sciences had to be protected and taken “underground,” practiced in secret or hidden in the dark. These dangerous circumstances made it virtually impossible for us to communicate authentically with well-meaning researchers. Therefore, many of the interviews that researchers conducted historically about our sciences, culture, and lifeways were done under duress. Since researchers had virtually no cultural context and our systems are so different than those that were (and are) dominant globally, data interpretation has been through a skewed lens.

Although a great deal has been written about the *Lakota*, we find the majority of it to be incorrect. Most of it has been written through a Western cultural construct by individuals who did not, and do not, speak our language or have experience with, or a context for, our complex scientific systems and lifeways (Fixico 1996). Europeans did not know us or observe our lifeways at a time prior to our being impacted negatively by colonialism and having to react to it under crisis, deception, violence, theft, and genocide. Colonial and early American historical records are particularly problematic, as they capture us through a politically charged lens at a time when the pushing of Native Peoples had become intolerable and we were moving, negotiating, and battling in an attempt to preserve life itself. Those who wanted our lands and viewed them as “resources” were able to justify their attempts at conquest by minimizing us as a People. During that time period, Western academia and science were affected and even directed by this, as part of a dominant societal narrative (Ewen 2017).

It is time to correct this narrative so that we, and the lands and life we and others caretake, may live. Due to the extreme circumstances present in the world today, our view is that life, itself, cannot afford for us or other Indigenous Peoples to be silenced within the sciences any longer. In the United States, it was not until 1978 that these legal restrictions were lifted (Zielske 2010). As a result, the application and explanation of our sciences has historically, more often than not, been narratively dismissed as some combination of “folklore,” “religion,” “spirituality,” and “primitive culture” in most interactions with Western academia (Ferguson 2005; Shorter 2015), put through a Western frame, and mis-recorded, mistranslated, and mis-stated by others through this inherently biased interpretive lens (Cajete 2000; Helander-Renvall et al. 2017). In many other cases, these scientific systems were not brought forward at all. Some of this pattern is a result of a systematic denial of access to publication in science journals due to “not meeting their criteria,” not being able to cite prior peer-reviewed works, a mainstream lack of understanding about how traditional knowledge is transferred and the protocols involved, or a lack of willingness to do so by our

Peoples for fear of misuse and exploitation of such knowledge by others. We applaud the current efforts being made to create a place for Indigenous traditional knowledge (TK) and traditional ecological knowledge (TEK) academically, politically, and internationally, and we wish to help to make sure this movement is successful.

Time to Respectfully Bring Traditional Knowledge Forward

Accepting change or new information does not often come easily or quickly. We do not expect all of what we say or illustrate to make sense to all scientists initially. We would appreciate those who would be willing to make a sincere attempt to try to understand. We are aware of the non-translatability of many of our scientific constructs and practices into European languages, as well as the fact that our mathematics, physics, and quantum-type constructs may be unfamiliar to many. However, supporting the use of Indigenous language and concepts serves to strengthen scientific diversity (McAllister et al. 2020). Therefore, we recommend that Western-trained scientists not dismiss that which is so very different. We understand that our respective systems developed from very different cultural experiences, history, political and religious systems, environmental conditions, innovation systems, experimentation, instruction sources, and geographical areas. Others, we know, may find some of this information to be a “missing” key for something they, themselves, have been exploring.



Chapter 2

WAZIYATAKIA (Facing to the North)

Welcome to Our Scientific World

Here, we have constructed a tipi-based model to introduce some of our foundational *Lakota* scientific principles, and indicate their place and role in the scientific structure (Figure 1). A tipi is a highly stable, conical tripod structure that is a physical manifestation of certain of our principles of mathematics and physics. Properly constructed, it is used to conduct and align certain forms of energy for scientific purposes (Goodman 2017; de Leon 2020). When constructing a tipi, the first three poles used must be the strongest, as they serve to create stability for the entire structure. In this illustration, these foundational poles are being used to signify the principles of *Mitakuye Oyasiŋ* (interrelatedness), *Škaŋ* (the constant motion of life) and *Paowanžila* (interconnectedness), which serve as the basis for our scientific systems. Many other Indigenous Peoples also have understandings of these scientific principles (Ferguson 2005). The base of this tipi represents *Unči Maka* (Grandmother Earth), as she provides the matter from which our physical bodies are designed and created, and upon which all life here revolves. As *Tukanšila*, (the Creator), also referred to as *Wakaŋ Tanka* (the Great Spirit), does not have a physical representation here on this earth for us, the rope that binds all the poles (or concepts) together will serve as *Tunkašila*'s spiritual container and we will refer to it as *čekpa* (the umbilical cord that connects this physical world to the spirit world and other dimensions.) In a *Lakota* construct, all life is comprised of three parts: *Taku* (matter), *Oniyaŋ* (energy or force) and *Naği* (spirit).

It is important to note that the *Lakota* do not traditionally have the concept of “religion” as is present in Western culture (Goodman 2017). Rather, *Tunkašila*'s energy and other dimensions are foundational to our scientific systems. Their presence is measurable, visible, and replicable. When certain conditions are created, we can enter these realms. These realms are not a “theoretical place” or “religious construct,” but accessible worlds that exist multi-dimensionally, in some cases in parallel and in others non-linearly, to our own. They are as real and tangible as the physical earth, but exist in different energetic planes. These planes operate at different speeds of existence and can be accessed as needed and appropriate by our scientists and trained practitioners. To try to separate such realms from the rest of our scientific construct would be equivalent to “denying gravity” as a force in physics, yet still trying to explain how we can stand on the earth.

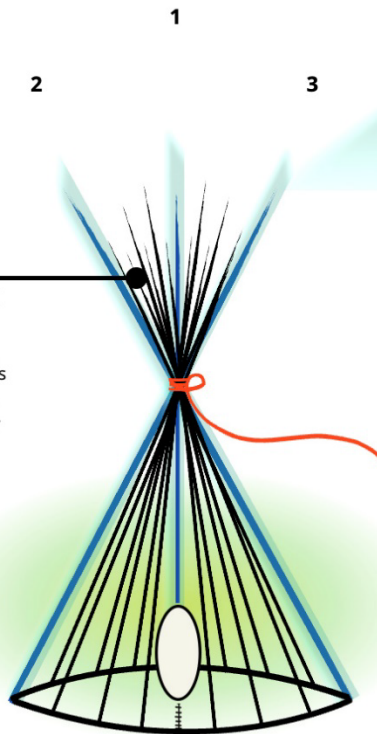
Accordingly, when we use terms in English that are generally construed as “non-scientific,” such as “spirit” or “Creator,” it is only because there are no words better suited for translating our understanding in that language. Unlike in mainstream science, we do not separate these concepts, as to do so would not allow us to work within them as a practical matter. In our tradition, “religion” was not forced upon anyone.

**WOYUCAN LENA OHINNIYAN
WOČICCUMPTAN IL UNHAPIKTE**

The ethical construct we use as Lakota scientists in the initial inquiry process to ensure that we cause no harm to Unči Maka.

Čekpa The rope is best described as an umbilical cord. As *Tunkašila* (the Creator) does not have a physical form, the *čekpa* signifies a physical container for *Tunkašila*, who binds all life together and connects the world in which we live to the spirit world and other realms of life.

Unči Maka This green aura represents *Unči Maka* (Grandmother Earth), our foundation.



Poles:

- 1.) *Mitakuye Oyasiŋ*: Interrelatedness.
- 2.) *Škaŋ*: All life is always in motion.
- 3.) *Paowansila*: Interconnectedness.
- 4.) *Tamahel*: Symbiosis.
- 5.) *Oyate ta wo'ope*: Specific protocols for each scientific step.
- 6.) *Wounspe*: Scientific language.
- 7.) *Wolakota*: Acknowledgment that life is everything.
- 8.) *Woableze*: Basis that there is no absence within what is created (including the genetic code for life).
- 9.) *Wowáčintanka*: Male and female balance (chemically, biologically, energetically and spiritually).
- 10.) *Taku Škaŋ Škaŋ*: Accessing the energy of the moment of creation.
- 11.) *Wowakaŋ*: Dissipation back to constituent elements, energies and spiritual spaces.
- 12.) *Wawaghwala*: Harmonious utilization of naturally occurring energies.
- 13.) *Wičahpi Woableza*: The knowledge that our existence is connected to the stars.
- 14.) *Wičoincaga Tokatakiya*: A Quantum-type physics and mathematics inherent in all Lakota scientific constructs. *Wičoincaga Tokatakiya* is able to provide measurement within the interconnectedness of the energies that flow simultaneously through multiple realms.
- 15.) *Wičoincaga Šakowiŋ Tokatakiya*: A Seven Generations Analysis is the basis for all Lakota application of science.

Figure 1. Lakota foundational scientific principles tipi-model.

In fact, we did not have the concept of “one belief or else,” and harm was not caused to life in *Tunkašila*’s name. Indeed, people were encouraged to have their own individual relationships with the Creator, and a set belief system in a religious sense did not form part of our science. Rather, a spiritual plane of existence with different accessible realms is part of reality and part of “physics,” not part of a “belief system” in the mainstream academic sense.

In Figure 1 you can see many of our foundational scientific principles, which serve to strengthen and support the overall structure. This is not a comprehensive list, but it allows us to begin our conversation in an authentic manner. These concepts include: *Tamahel*, which most closely aligns with the concept of symbiosis (although we do not have the concept of a “parasitic life form,” since we understand that all life has a purpose, a role, and is necessary and contributory to the circle of life overall); *Oyate ta wo’ope*, the specific protocols to follow for each scientific step; *Wounspe*, or the scientific language; *Wolakota*, the acknowledgment that life is sacred and comprised in everything; *Woableze*, the principle that there is no absence within what is created, as it is always complete and with purpose (and may be present in more than one place or dimension simultaneously); *Wowačintanka*, or the male and female balance (chemically, biologically, energetically, and spiritually); *Taku Škaŋ Škaŋ*, the ability to identify, know, and access the energy of the moment of creation; *Wowakaŋ*, the principle that all matter, life, energy, and spirit dissipate back to constituent elements, energies, and realms; *Wawaghwala*, or the harmonious utilization of naturally occurring energies; *Wičakpi Woableza*, the knowledge that our existence here is in direct relationship to the solar system, stars, and our place in the universe; and *Wičoincaga Tokatakiya*, the principle that a quantum-type physics and mathematics are inherent in all Lakota scientific constructs. More accurately, *Wičoincaga Tokatakiya* provides measurement within the interconnectedness of the energies that flow simultaneously through multiple realms; and *Wicoincaga Šakowiŋ Tokatakiya*, a Seven Generations Analysis that serves as the basis for final decisions regarding the *Lakota* application of science.

As indicated in the top left-hand corner of Figure 1, an ethical construct serves as the first step in all inquiry by a *Lakota* scientist. We refer to this ethical construct as: “*Woyucaŋ lena ohinniyaŋ wočiccumptaŋ il unhapikte*.” This inquiry process is made to ensure that we do as little harm as possible to *Unči Maka* and the life she supports. As a *Lakota*, there are two questions that a scientist or scientific team must ask as the starting point of all inquiry. First, the ethical purpose of the inquiry must be determined. Secondly, the scientist or team must determine what the impact of that research or inquiry is on all other life. The first implicates the spiritual and energetic power available to solve the problem (if the purpose of our inquiry is aligned with the natural scientific processes of life, such power and forces are available for us to “tap into” and align with to address the problem), while the second implicates the potential physical and spiritual results or consequences from the inquiry (what is the cost to *Unči Maka* and other life forms?). A final assessment also occurs toward the end of the scientific process, which is represented here by Tipi Pole 15, *Wicoincaga Šakowiŋ Tokatakiya*, which can be described here as a “Seven Generations Analysis.” At this step, the scientist or team evaluates the impact of the innovation or research on the sustainability of all life for the next seven generations. Based on this, decisions are made as to whether or not research conclusions should be applied.

The Application of our Sciences

The Lakota scientific approach entails great communal and individual effort, precision, awareness, preparation, and planning. Upon review of our strict ethical construct, it is possible to understand why the technologies we utilized were so different than those cultivated and adopted by the dominant culture. What could be immediately beneficial as an invention for society was frequently rejected for application due to our complex ethical and sustainability-based scientific analysis. What is often seen by the Western culture as “primitive” was in fact developed in most cases through this lengthy and complex process. It can be viewed as a form of “*Lakota Economics*.” If the cost of innovation was determined to be too high for the environment, society, or life as a whole, we made a collective decision not to proceed further with the innovation. Instead, we would modify the design or find another technology that was aligned with the above principles and incorporate this into our communities. This might be seen as a “harder” or “slower” approach, but it resulted in the greatest potential long-term benefit for the sustainability of all life, which is our guiding scientific goal.

Importantly, and unlike the school of thought shared by many Western-minded environmentalists, *Lakota* science does not seek to remove humankind from the natural world to “save it.” On the contrary, we understand that we are intended to be a part of it. With that responsibility comes the realization that we must hold our place within it harmoniously and for the benefit of all life. We must understand the impact that our actions have and act accordingly. The preservation and health of the whole ecosystem must be considered equally, without judgement or allocation of importance, from the smallest type of life form to the largest. In the *Lakota* construct, no life is an “enemy” to be eradicated, nor do we place value judgements on any creature or their need to have a viable home and lifeway. All are to be considered and allotted the conditions they need to live.

A historical example of the clash between our methodology and a Western methodology, with regard to innovation, can be seen with the introduction of the metal pot to our communities. Such examples can be seen in other Indigenous communities as well (Kawagley 1993). Upon the arrival of Europeans to our lands, the *Očeti Sakowij* utilized the stomach liner and bladder bags from *Tatanka* (“American buffalo,” *Bison bison*) for cooking and food storage. These are waterproof, possess enzymes that help in the digestive processes, and are completely biodegradable. To acquire, prepare, and use the bags took skill and hard work by our hunters and their families. As they needed to be replaced fairly often, the process of acquiring them helped us to develop more as individuals and as a community. When lead-contaminated metal cooking pots were introduced to us by European traders, some of our people accepted this technology assuming that the above scientific innovation processes had been followed. Indeed, we knew no other system, as ours had been in place for so long and was a center point of our culture. Soon, stomach illnesses plagued our people, and our societal and economic systems began to change as the “desire for more pots” grew and the demand for the items we needed to acquire to trade for these pots (animal skins and pelts) increased.

Cross-Cultural Assumptions

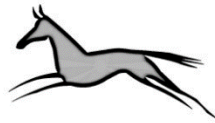
The assumptions and cultural interpretations we made about the different European Peoples we encountered in our lands were based upon our own experiences, sciences, lifeways, and protocols. We did not experience what they had experienced, our environmental conditions were not the same, and we had not suffered from religious persecution and thousands of years of total warfare, as they had. The assumptions and cultural interpretations we made have caused confusion and challenge from first contact. Our systems had been honed and developed over many thousands of years with sustainability as the goal, and we did not have a context for another way of being.

We understand that the Europeans and colonial Americans also made assumptions about us based upon their lifeways and experiences, and they approached us based upon these and saw us through such a lens. Their ideas about us can be seen in black and white on the pages of countless books, articles, and other publications (Fixico 1996). Yet we cannot recognize ourselves, our sciences, or our histories in these pages. We do not know to whom they are referring. However, we know that it is not us. Due to these things, and for the sake of helping rebalance the world, we understand that we need to “start again,” from a place of respect and equal footing, to progress. This needs to be reflected in academia and the sciences. In order to move forward, old battles based upon past assumptions must be addressed. It is only from such a place that we can come together to change the current trajectory and help rebalance *Unči Maka* and preserve life.

***Mitakuye Oyasiŋ*: A Lakota Science Foundational Principle**

We will use the principle of “*Mitakuye Oyasiŋ*” to provide a teaching example regarding our principles and the difficulty in accurately capturing our concepts utilizing the English language. As *Lakota*, we express the intention and the meaning encoded in the words in Figure 2 with the phrase “*Mitakuye Oyasiŋ*.” These words can be roughly translated into English as “all my relations” (Modaff 2019). This concept forms one of our strongest scientific foundational principles, and it is represented in this tipi model by the concept “interrelatedness.”

As *Lakota*, we use “*Mitakuye Oyasiŋ*” to close every prayer, as well as at the end of most statements of import. By invoking this phrase, we are exercising our caretaking responsibilities for all lifeforms as *Lakota* by putting our energetic intention behind acknowledging and asking for health and wellness for “all our relations.” We never forget our relatives, no matter how macro (*Unči Maka*) or micro (microorganisms), and no matter if it is an elemental energy-based being such as the *Wakiŋyaŋ* (thunder and lightning beings) or the creature that embodies this element in physical form, such as *Šungwakaŋ* (the horse). We are asking for the energetic intention that we generate and put forward, and the energy and life force inherent in each of these life forms or forces mentioned, to be extended and bestowed upon all forms of life (all our relations). The interrelatedness of all life means that all life forms require consideration, as each creates and receives impact. No forms of life are excluded from this. As *Lakota*, we have a much broader understanding of what constitutes “life” than is generally accepted by Western science. As you can see from the example just provided, it is not possible to accurately capture many key scientific understandings and principles that we developed as *Lakota* using the English language, as there are often no direct conceptual translations.



Tunkaŋšila (Škaŋ and Wo'ope),	Creator, sacred movement, great vibration, and Mother Law,
Taku Waŋkaŋ ki lena nitawa, na Ohinniyan na	All sacred entities are yours, and there are many and they are immortal.
Ota,	Every day and every night we remember you.
Anpetu na haŋyetu iyohe oneksuyapi.	Sun immortal, Air immortal, Earth immortal, Rock immortal, Water immortal, Moon immortal,
Wi Kaŋ	Four winds, we remember you.
Naŋi Kaŋ	West wind,
Maka Kaŋ	Thunder and lightning reside in the first direction of the world.
Inyan Kaŋ	Their messengers are the horse and the thunderbird, Their color is black, Their nature is water.
Mni Kaŋ	North wind,
Haŋ Wi Kaŋ	405 Grandfathers and Grandmothers who brought us our ceremonial protocols reside in the second direction of the world.
Tatuye Topa oniksuyapi	Their messenger is Buffalo-Pte, Their color is red, Their nature is earth.
Wiyokpiyatakiya	East Wind,
Waziyatakia	The division between day and night resides in this third direction of the world.
Wiyohiyampatakiya	Their messenger is the black tail deer, so we do not eat of its flesh.
Itogatakiya	Their color is yellow. Their nature is Sun, or the man who paints himself yellow and comes every day.
	South Wind,
	All mankind's faces are made in this fourth direction of the world.
	Their messenger is bald eagle, white on the head and white on their tail feathers.
	Their color is white, Their nature is the medicines of the world.

Figure 2. *Lakota* explanation of *Mitakuye Oyasiŋ* in the *Lakota* language and translated as closely as possible into English. *Anpetu Luta Wiŋ*, (Dr. Antonia Loretta Afraid of Bear-Cook), personal communication 2022.

Škaŋ: Multi-Dimensional Worlds in Constant Motion

The concept of *Škaŋ* is a foundational principle of our *Lakota* science. It encapsulates the fact that all life is in constant motion at all times. Nothing is in stasis. *Taku* (matter), *Oniyan* (energy or force) and *Naŋi* (spirit), the three parts that make up life, are each in constant motion and, therefore, in a constant state of transformation (which is necessarily not linear.) In fact, *Taku*, *Oniyan* and

Naḡi are each comprised of foundational particles that are moving at different speeds. If we utilize *Šungwakaṇ*, a horse, as an example, the speed at which the particles move from slowest to fastest would be as follows: *Taku*, the matter that comprises the physical body of the horse—slowest; *Oniyan*, the energy or forces that hold that matter in place so the body parts stay together as what they are—a leg, neck, hoof, etc.—faster; and *Naḡi*, the spiritual essence—fastest. This is true for every life form that has a physical body.

It is this system that helps to create the world that we each experience as individual life forms. It is also present in other realms of existence that are not accessed as commonly by other cultures, today. It is this motion, and the intersection and combination of these elemental constructs, that create the conditions of life as we know and experience it. The forces comprised in, associated with, flowing through, and impacting *Taku*, *Oniyan*, and *Naḡi* affect everything we do and are. They can be accessed and utilized by mankind and other life forms when the correct conditions are met, and when intention and actions are aligned with the natural design for life. When we state that our mathematics and physics are “quantum” or “multi-dimensional,” we are partly referencing our ability to understand how to step into, account for, and work within *Škaṇ* as it affects each of these elemental constructs and worlds in linear and non-linear time and motion.

Measuring *Škaṇ* with mainstream scientific techniques and technologies is partly possible. Mainstream science has been exploring quantum physics concepts since the early 1900s, and it is steadily evolving (Ponte and Schäfer 2013). The technology available today in mainstream science cannot measure these factors completely, as it can only record what it can perceive through the instruments that currently exist. Due to this, all mainstream science measurement within the working of *Škaṇ* is only partial at this time and, therefore, necessarily misunderstood without the complete outcomes and context for what is being measured. The whole dataset with regard to matter is often also not available, and an understanding of all the forces and energies at work have not been applied.

Calculations for Life within *Škaṇ*

Lakota scientists, overall, did and do not have a need to understand every detail of such creation and life impacting processes across all time and multi-dimensional space. To us, this was and is “the Great Mystery,” which the human mind cannot calculate and *Lakota* scientists would not seek to do. It is quite enough for *Lakota* scientists to be able to work effectively and positively within *Škaṇ*, utilizing and applying our ethical constructs to protect all life, and to understand it sufficiently to achieve purposes deemed useful and beneficial for society, all of our relations, and the balance of the world. It is important to note that *Lakota* scientists traditionally did not develop external tools of measurement, such as the ones developed by Western science, with purpose. We (our bodies, minds, and spirits) were, in fact, the technology utilized and the primary “tool” of measurement. We achieved this through great training, discipline, and regular access to these different multi-dimensional realms. The efficacy and success in such processes can be analyzed, adjusted, and replicated through skilled elder instructors, as deemed necessary or productive, in all such matters.

Indeed, a separation between “fundamental” and “applied” research does not exist within Lakota science. All research is conducted with a question or purpose (or both) in mind. Even research that could be considered “fundamental” on the surface, such as the long-term observation of certain life forms or periods of time spent in nature in a ceremonial context, serve a purpose, provide empirical data, and answer direct questions. As we regard all life forms as having “medicine” and understand the fundamental principle *Mitakuye Oyasiŋ*, we conduct such “studies” in a targeted manner intellectually, emotionally, and spiritually. We are prepared to absorb everything we experience, and understand it to be directly related to our question. We understand we will receive empirical evidence, and we directly apply these lessons to strengthen ourselves and our communities, and to maintain ecological and spiritual balance.

Historically, preparation for such training and ability began in the planning stages of life. Our *Oyate* planned carefully before a child was to be conceived, and this careful planning and preparation continued in utero. Starting from a very young age, our children were taught how to utilize all of their senses (including a number not identified yet by mainstream science) to be able to detect shifts in *Taku*, *Oniyan*, and *Naŋi*, as well as to know what to do when such shifts occurred to achieve desired outcomes. Our teaching and learning systems are and were experiential. Many of our ceremonies and scientific practices are disciplined, highly structured, and replicable processes expressly designed to support us to connect, travel to, and experience these other realms. We can receive transformative matter and energy, as well as knowledge and specific desired outcomes, from them. These ceremonies and scientific practices, and our level of performance and commitment within them, also hone and enable our development as it relates to life in this world, as well as in other multi-dimensional realms.

This is the main reason why drugs, alcohol, and other chemicals were not a part of the *Lakota* way of life prior to their introduction by colonization. Since our body, mind, and spirit were our primary “technology” and they allowed for our “scientific access points,” we had to keep them pure and functioning optimally at all times, to be able to fully realize and implement what we are designed to do. Not having created or used drugs, alcohol, and other mind-altering chemicals with great purpose, we did not understand that people would do so to manipulate others or for recreation. Initially, such drugs were mixed surreptitiously into our food and drink by European traders and high-level military officers during times of trade and treaty-making (*Harper’s Weekly Magazine* 1873). Later, when they were openly offered, we initially interpreted such substances as a type of “medicine.” They were not and are not required for our work with or within our scientific systems.

From a *Lakota* science perspective, when one wishes to “measure” any form of life, it is critical to factor *Škaŋ* into the equation. There are five critical concepts to always consider collectively: life force (*Ouŋ*), time (*Otro’kahe*), matter (*Taku*), energy (*Oniyan*), and spiritual and other dimensional realms (*Naŋi*). We must understand and account for the fact that each moment of existence is necessarily unique. For example, when wishing to understand *Šungwakaŋ* from the *Lakota* science perspective, we must be aware that each one of these factors is changing at all times due to *Škaŋ*, the constant movement of each of the parts that make up life. Due to this constant movement, the measurement of life will necessarily—and literally—be different moment to moment. Patterns are helpful to notice and identify. However, unless *Škaŋ* is taken into account, the interpretation will rarely, if ever, be accurate or meaningful, either at a given moment or extrapolated over time. This

is due to the effect of *Skən* upon *Taku*, *Oniyan*, and *Naği* at each sequential moment, usually non-linearly.

Currently, the way that the dominant culture understands “life” is from a standpoint of birth, life, and death. Therefore, Western science naturally looks to measure for each of these when measuring “life.” However, when “life” is understood to be comprised of *Taku*, *Oniyan*, and *Naği*, and *Skən* is factored in, measurement becomes more complex.

For measurement purposes, time (*Otro’kahe*) relative to life (*Oun*) is a function of the relevant matter (*Taku*), energy (*Oniyan*), and spiritual realms (*Naği*) impacted and recorded at that precise moment, which is not linear and is multi-dimensional.



Chapter 3

WIYOHİYAMPATAKIYA (Facing to the East)

The Territory We Protect

The United States and Canadian governments have worked hard to rewrite the narrative of Indigenous Peoples in North America. Currently, the *Očeti Šakowin* are separated both geographically and legally under United States and Canadian law. Within the confines of the United States, the Peoples that make up the *Očeti Šakowin* each conduct ourselves as sovereign nations. Before contact with the European cultures that arrived in our lands in the 17th century CE and thereafter, our Peoples, together with our allies and other Native nations, sustainably managed a significant portion of the North American continent. These areas ranged from what is now Colorado in the west to Wisconsin in the east, and from Kansas in the south and well into Canada to the north.

In Figure 3, the geographical area highlighted in yellow indicates much of the land base that we consider ourselves responsible for co-managing. Indeed, much of this geographical area was historically inhabited by different Peoples who spoke our same language base. Western academia refers to this shared base as the “Siouan” language group. Our language evolved from a time when we could understand and communicate with the spiritual realm and its messengers, as well as communicate more fluently with animals and all other life forms. Indeed, as is the case with many other Indigenous Peoples, the sounds in our language can all be foundationally identified in nature specific to a geographical location (Ferguson 2005). Our internally kept records establish this area as having been historically much larger, extending as far south as what is now Mexico and Central America, as far east as what are now the Carolinas, and up to the Yukon area in what is now Canada.

A Lakota Perspective Regarding Western Origin Theories

As is the case with most Indigenous Peoples, we necessarily have a different narrative than the one put forward about us by the dominant culture. We do not consider ourselves to be an extension of Europe, Asia, or Africa, and we have been in our lands much longer than Western academia and science acknowledge. Despite Western academic scientific findings that show evidence of our ever-longer recognized presence in our homelands (Ardelean et al. 2020; Bennett et al. 2021), the data are largely interpreted to circle back in origin to Europe, Asia, or Africa. Therefore, it is still largely viewed through a Eurocentric lens. We do not share the dominant culture narrative that the ancestors of all Native Peoples walked across the Bering Strait to populate the Americas recently or anciently (Ewen 2017; McGhee 1989; Watson 2017). As *Lakota*, we would never deny another culture or Peoples their narrative. That is against our belief and governance systems. However, we do expect the same courtesy to be extended by other Peoples, governments, and cultures in return.



Figure 3. Map of North America, showing the extent of *Očeti Šakowiŋ* presence, linguistic base, intermarriage, and co-management of lands in yellow. Courtesy of Native Lands Advocacy Project and *Očeti Šakowiŋ* Treaty Council.

Obstacles to Practicing our Sciences

The *Očeti Sakowij* have never lost a war with the United States. Indeed, we entered into treaties as a sovereign nation with the United States government in 1851 and 1868 (Kappler 1904). We did this not from a place of weakness, but from a position of strength, power, and great love. We entered into these nation-to-nation agreements in an attempt to honor our responsibilities to *Unči Maka* (Grandmother Earth) and all life. If we could keep the Western culture's total warfare approach away from the geographical foundation of our sciences—*He'Sapa*, our sacred Black Hills, and surrounding lands—we could continue to practice our life-giving and restorative sciences for the world (Sundstrom 2021). From this place, we could take the disruptive energies and forces that were being created and could counter them by practicing our sciences of renewal. In this way, we could exercise our responsibilities to *Unči Maka* and all life by helping to maintain the balance necessary for Her to stay healthy.

Even today, the United States does not honor these treaties. To our horror, activities have happened and are happening in *He'Sapa* and in all of our traditional lands that are causing imbalance (Lewis 2017; Torma 1986). Our ancestors entered into treaties with the United States and Canadian governments to ensure that we could continue to preserve geographical areas large enough to protect the continuity of life that lay upon it, under it and over it. Governance of these lands has largely been denied to us by continuous treaty breaches, fraud, unlawful appropriation, and misstatement of factual and legal positions agreed on at the time of treaty entry by the parties (Anderson 2014). Despite numerous court rulings and a United States Supreme Court ruling in support of our position, corrective actions have not been taken (Legal Information Institute 1992). The *Lakota* never agreed as a matter of law to sell or transfer legal rights in our lands. We have endured the most serious push-backs possible in seeking to enforce our rights under international, domestic, *Lakota*, and natural laws (Anderson 2014; Fenelon and Alford 2020; French 2003; Gonzalez and Cook-Lynn 1999; Greene 2021; Sundstrom 2021). Yet every day we attempt to educate and encourage the United States and Canadian governments and the American and Canadian publics to address these legal and moral breaches. Not just for ourselves, but for them and for the present and future preservation of all life.

If you ask an expert on international law what the most powerful part of a treaty is, he or she will tell you that it is not what is in the treaty. On the contrary, it is what is expressly not in the treaty, in terms of what sovereignty is reserved to the Nations entering into them, that holds the most power (Kalt and Singer 2004). As *Očeti Sakowij*, we never gave up the right to protect *Unči Maka* and all life through the practice of our sciences, and we never will. This is and always was a fundamental foundation of our life ways. "*Omaowaŋč'a*," or the knowledge that this is one world and there is a place and purpose for all life, is not just a methodology. It is what we defend and that for which we stand as a People. It is from this place that we engage with you today—scientists to scientists. We understand that our laboratories are different, as are our methods and methodologies. However, our responsibilities to the public and all life should be the same. There is just one Earth.

A Path Forward for Research in the Americas

We understand that Western science regularly conducts measurements around the world despite often not having a historical connection to, or understanding of, the specific geographical place, the cultures, or Peoples who have existed, flourished, and caretaken those lands and the life it holds. Whether intentional or not, this approach has its roots in colonization, and as a result, this model often produces contention, pain, and mistrust rather than unity (Nuñez et al. 2021). In addition, many of the findings are simply not accurate, and the rate of such findings being overturned within a few years' time is unacceptably high for the amount of societal pain, destruction, and disruption they cause (Ioannidis 2005; Smith 2013). If the point of scientific research is to find understanding and truth, there is a better way forward and we need to pave this way for scientists around the world.

Due to the circumstances detailed above, the Original Peoples of the Americas deserve a fresh start with regard to the application of Western science and research in our territories and about our genetics, histories and lifeways. This research, data generation, analysis, and interpretation should be free from the bias caused by a fear that our existence as Original Peoples will somehow invalidate the history and legacy of others. After what we have endured, combined with the intricate nature of our societal, scientific, and educational systems, such research needs to be carefully designed, conducted, and considered with equal respect. Bias exists in unexpected places, and many of the current accepted scientific reference points and processes were created during a time period of great fear and religious oppression within Europe, and subsequently within the Americas.

As individuals and societies, we can only be expected to understand the world as we have each experienced it. However, each day the effects of climate change become harder to ignore, politicize, and explain away, and pandemics remind us that the dominant life governance systems are failing. With such clear signs that the health of all life is at risk, it behooves all scientists to open their minds to the existence of other narratives and other scientific systems. It is critical that the scientific community quickly provide venues for these narratives and scientific systems to be published and brought forward equally in journals and otherwise. We can learn from this scientific diversity, rather than dismiss or silence it.

Chapter 4

ITOGATAKIYA (Facing to the South)

Research on the Horse in the Americas

With regard to understanding the history and evolution of the horse in the Americas, we believe that we have the opportunity to help shape, guide, and lead what we see as the first genuine attempt to bring together Indigenous and Western sciences. Until this point, the process and the aftermath of colonization left the *Lakota* and other Indigenous Peoples with no other choice than to protect our traditional knowledge, including our relationship with *Šungwakan*, the Horse Nation. If the Peoples who have inhabited the lands at issue for tens of thousands of years are saying they “always had the horse” (Collin 2017), and if Western academia understands that horses originated in America but believes they subsequently went extinct and credits colonial powers with the reintroduction of the horse to the Americas, it is our obligation, as scientists, to take a serious look.

We sustainably managed and cared for life in large geographical areas by exercising our scientific principles for many thousands of years. Our relationship with *Šungwakan*, the Horse Nation, was integral to our lifeways and our ability to successfully co-manage these lands over this time period. Figure 4 offers a description of our traditional relationship with *Šungwakan* in our *Lakota* language by *Tanka Omniya* (Robert Milo Yellow Hair).

For us as *Lakota*, *Šungwakan* is a sacred being that holds an integral place in our sciences. It has the ability to accompany us into each of the realms through which we travel, and it often serves as an energetic and spiritual guide and companion. Indeed, as the teaching offered by *Tanka Omniya* indicates above, you cannot have a *Lakota* separate of the horse as we were—and are—one with them. As is the case in our language, there is no past, present or future for us with *Šungwakan*. The Horse Nation is with us and a part of us and has been so since “time immemorial.”

As we have explained, the *Lakota* language holds power in the vibrations, manner, situations, and intent within which it is spoken, and it plays a key role in our scientific systems. The use of pronouns is very specific within the *Lakota* culture and language. They are utilized to reflect relationality and responsibility, rather than possession. For example, let us examine the use of the pronoun “our” as it is utilized in *Nača* (Chief) Joe American Horse’s quotation at the beginning of this paper: “We have existed with the horse since time immemorial. The horse originated in our lands and from there, Creator gifted it to the world.”



**Otokahe haŋ ska wičasa ki waŋ zikzila
omanipi na maka mani pelo.**

In the beginning, the tall man [the first Europeans to reach the Lakota] walked everywhere and could only do things by walking.

Lakol oyate šung'akanka wico'uŋ.

As Lakota People, we were always on the horse and in relationship with the horse.

**Šungwakaŋ kihe taku yapi. Wo'ihanble hel ko
el op'ha pelo.**

The horse that was with us was the one we were in relationship with.

The Lakota revere the horse. They are even in our dreams and in our spiritual visions.

**Wakul omani pi caŋ, wak'in ki yapi,
wičacazhe hel na kuŋ op'ha pelo.**

When we are out hunting, we are at one with the horse. When they [the hunters] become one with the horse, the hunt becomes successful because it is done respectfully. Even the names we carry today hold references to our deep relationship with the horse.

Wo ečuŋ hel naku waciŋ wiča ya pelo.

With any type of community work, celebration or sacred work, we depend upon the horse. In every aspect of our lives, we depend on them.

Ehu topa ki naghi yuha yelo.

This four-legged relative has a spirit and the horse extends that spirit and also fills us.

As Lakota, everything that we do is with the horse. We honor the relationship we have with this horse because it makes us who we are as Lakota.

**Lakota ki he taku el heča šunkakaŋ he
kaghelo.**

[Lakota refers to all Nations, our people all over North America for as far as we could go. It is a centering. It is the way that we create these places from which we can observe and participate, as well as conduct and all be part of ceremony. This can be done when we are in relationship with our horses.]

Figure 4. Explanation the *Lakota* relationship with the horse in the *Lakota* language, with the closest English translation possible. *Tanka Omniya* (Robert Milo Yellow Hair), personal communication 2022.

Nača Joe American Horse is a *tiospaye* leader for the *Oglala Lakota Oyate*. A *tiospaye*, or extended family group, is part of the traditional *Lakota* societal and governmental system. Such leaders are not elected officials in the Western understanding of leadership. Rather, due to their character and the way in which they love, protect, and care for the *Oyate* and all life, they are selected by the *Oyate* to serve as their voice (Charger et al. 2008). In speaking about *Unči Maka* and the lands we protect, *Nača* American Horse is not claiming possession or ownership of such lands, just as he would not when referencing “our” with regard to *Šungwakaŋ*. These concepts are not part of the

Lakota scientific construct. Nobody can “own” the sacred, or that which holds the essence of life. Instead, his use of “our” indicates the relationality between the *Lakota*, *Šungwakan*, and *Unči Maka*, as well as *Nača* American Horse’s responsibility to protect them and to stand for them, as would be expected of his position.

Indeed, from a *Lakota* perspective, the horse is attributed its own “Nation” status. The “Horse Nation” is comprised of whatever species, subspecies, type or breed that it has been and will be. *Lakota* science reflects the reality that any ancestor is part of its descendants. How much or how little of that part is critical to a life form is not measurable, but displays as necessary for life to go forward. Creation and life adapt based upon environmental and circumstantial forces and change. For us, this does not make them another species or a sub-species. It does not make them weak or less “what they are,” nor does it mean that the horse before such adaptation went “extinct.” Rather, it is proof of the strength, sensitivity and resilience of life at work through *Škan*. To date, this relationship with *Šungwakan*, the Horse Nation, and our understanding of its evolution over time is what Western academia and science has attempted to take away from us.

Šungwakan was *Šungwakan*, whether it was grazing in the valleys with its herd mates or whether it chose to interact with us and create a relationship. We did not distinguish between horses who chose to live without human contact and those who did. Indeed, the relationship between *Šungwakan* and the *Lakota* was one of mutual commitment based upon choice. We did not facilitate scenarios that would allow for forced breeding, as doing so would not have honored the Horse Nation’s free-will to create its own familial bonds. This would have been against our scientific principles. If you look at the map indicating our ancestral homelands (Figure 3) and note our own history on how it extended further, you can see that if there were horses on the North American continent at any particular time, we would know. Indeed, *Šungwakan* helped us to manage these territories for thousands of years.

As *Lakota*, we would not have assumed to change the life-patterns of *Šungwakan*, or any other life form, in order for us to develop a relationship with that relative. We strove to enter *Šungwakan*’s world and did not demand that he or she enter ours in order to have a relationship with us. If you capture *Šungwakan*, lock it in a corral, force it to breed, and condition it to communicate with you on such terms, what have you learned? Does this forced relationship somehow demonstrate the power of human beings? Does it demonstrate *Šungwakan*’s weakness or inferiority? As *Lakota*, such treatment of *Šungwakan* would simply be demonstrative of mankind’s lack of understanding of his or her place in the circle of life. Indeed, we do not even have a word for “domination” or “dominating behavior” in our language as it was not part of our scientific construct. Thus, we would not seek to measure it or develop a tool to do so in order to learn about the Horse Nation. In fact, from our perspective, such a measurement would be demonstrative only of the society or culture that created those forced conditions, not of *Šungwakan*.

The Effect of Colonization

Our lifestyle and the lifestyle of the life forms we committed to protect, changed dramatically after Western cultures learned of our lands and made the decision to consider them an untapped resource. For us, and for many Indigenous Peoples, “surplus” is the bounty of life, and it was what

Tunkašila gave to the world. Our lands were not empty, as everything that was there needed to be there to keep the ecosystem in balance. We worked hard to cultivate and maintain a healthy place within this system. The Western cultural appetite for our lands was voracious and unlike anything we had seen before or can understand, even today. The “total warfare” approach was one with which we were not familiar, as it was against our scientific principles. We tried all manners of kindness, generosity, avoidance, and negotiation. In many cases, Native Peoples were forced to resort to battle and war in an attempt to protect our women, children, and elders, the life forms with whom we shared our existence, and *Unči Maka*.

Throughout all of this, *Šungwakan* was affected as much as we were. What colonization has done to us it has done to *Šungwakan*. To see such abuse and disregard for the sacred broke our hearts. Military soldiers implementing United States policy slaughtered our Horse Nation relatives, while the officers often made sure to keep the “best” of our horses for themselves (Cozzens 2016). In addition, millions of our horses were shipped around the United States and the world to fight in wars not of their making, hunted and sold for slaughter, utilized only as beasts of burden until death, and force bred in captivity, becoming the “base stock” of many modern American breeds. We fought to protect them, and we took great efforts to hide them and keep them safe. We did everything we could to stop the onslaught. We cried for them, and many of us died alongside them. We still cry for them today. As *Lakota*, it is up to us to ensure that *Šungwakan*’s story in our lands is told accurately, no matter how painful or how challenging this may be within mainstream science and academia. We owe it to *Šungwakan* and to the world. Our teachings tell us that *Šungwakan* serves as a mirror for mankind. It is time for us to look into that mirror and see ourselves. From this place, we can turn the tide and create real change for all life.

The Effect of the Practice of our Scientific Systems on our Lands

One of the main reasons we have taken the time to introduce ourselves and our sciences authentically in this manner at this time, is to help you to see that we lived within and worked very hard as a society to help to create and maintain a very different world than the one experienced by cultures in other parts of the globe or in the Americas at present. Today, we still fight to preserve and hold onto this world, and we will continue to do so, as in our experience it is the one thing that stands the test of time. In order to truly understand the life we experienced in the Americas pre-colonization, and the relationships we had with all its life forms, Western scientists, together with Indigenous scientists, will need to develop an understanding of the impact that the practice of our scientific systems has on the genomic code for life. Likewise, they will need to understand the effect the practice of these systems has on *Wowakan*, the dissipation of matter and the energy and forces that hold that matter together, with regard to the life we are trying to measure.

If mainstream science plans to continue to utilize the same tools, methodologies, and interpretive methods it uses and has used to validate its history, approaches, and narrative and apply them to us and the life we managed and protected in North America unaltered, it will necessarily miss—or misinterpret—what actually occurred. If Western science has ever wondered why such a significant portion of Indigenous Peoples refuse to participate willingly in Western science and medicine, there are many reasons for this absence. If you review our scientific principles and methodologies from the perspective we present, you will be able to identify them fairly easily.

Although the *Lakota* would never presume to speak for all Indigenous Peoples, we can say with authority that many of our foundational principles are similar (Cajete 2000; Peat 2005; Zielske 2010).

Where we are today is a natural consequence of the “one correct way” approach to religion and power that was forcibly mandated throughout Europe for thousands of years. Western history is filled with examples of academics and scientists whose careers, reputations and lives were threatened for advancing scientific theories that are now deemed to be fully accepted. We know that carrying this approach has not been pleasant or easy for anyone, and that it was not adopted by choice by many. As *Lakota*, we did not manage life or the advancement of knowledge in this way, as it simply is not sustainable. Denying others their voice or their narrative cannot stand the test of time, and it denies us, as scientists, an opportunity to grow and learn. If this “single narrative/single system” approach is no longer serving the world, then, together, we can simply decide that mainstream science has evolved enough to let it go.

Conclusion

We, as *Lakota*, are here and our presence does not invalidate anyone else’s existence, culture, or history. As *Lakota*, we did not and do not have this concept. *Tunkašila* put each and every one of us here on *Unči Maka* with purpose. As *Lakota*, we did not and do not question this. In fact, we strove and strive to honor this. Even those who were our enemies for periods of time in our history understood that we did not practice total warfare. We resulted to war strategy and tactics when we believed that all other modes of communication had failed and we had to protect the life that we were responsible to and for, but we never decided any other People or form of life did not have the right to exist.

History may look back at our decision not to conduct total warfare as a mistake in North America. We could have changed ourselves, adopted the “total warfare” approach that our then enemy used against us, and continued to physically fight the United States government. However, had we done this, we would have ceased to be “*Lakota*,” which means “a friend and ally to all life.” We would have gone against our scientific principles and we would not have been able to fulfill our promise to *Unči Maka* and the life she supports. We would not have been able to begin this conversation with you today at a time when the world needs it more than ever. Our ancestors made very difficult decisions, thinking seven generations ahead and more for what the world would require and when our *Oyate*, our sciences and our lifeways would be most needed and able to be heard. We are in the seventh generation. We, as *Lakota*, are speaking out for *Unči Maka*, *Šungwakaŋ*, and for you.

Mitakuye Oyasin



REFERENCES CITED

Afraid of Bear-Cook, Antonia Loretta

Oglala Sioux Tribe. Lives on Mohawk Indian Territory, *Akwesasne*, New York. Oral teaching and contextual interpretation regarding *Mitakuye Oyasiŋ*. Personal communication, April 1, 2022.

American Horse, Joseph

Oglala Sioux Tribe. Lives on Pine Ridge Reservation, South Dakota. Oral teaching and contextual interpretation regarding *Šungwakaŋ*. Personal communication, February 14, 2022.

Anderson, Gary Clayton

2014 *Ethnic Cleansing and the Indian: The Crime That Should Haunt America*. University of Oklahoma Press, Norman.

Ardelean, Ciprian F., Lorea Becerra-Valdivia, Mikkel Winther Pedersen, Jean-Luc Schwenninger, Charles G. Oviatt, Juan I. Macías-Quintero, Joaquin Arroyo-Cabrales, Martin Sikora, Yam Zul E. Ocampo-Díaz, Igor I. Rubio-Cisneros, Jennifer G. Watling, Vanda B. de Medeiros, Paulo E. De Oliveira, Luis Barba-Pingarón, Agustín Ortiz-Butrón, Jorge Blancas-Vázquez, Irán Rivera-González, Corina Solís-Rosales, María Rodríguez-Ceja, Devlin A. Gandy, Zamara Navarro-Gutierrez, Jesús J. De La Rosa-Díaz, Vladimir Huerta-Arellano, Marco B. Marroquín-Fernández, L. Martín Martínez-Riojas, Alejandro López-Jiménez, Thomas Higham, and Eske Willerslev

2020 Evidence of Human Occupation in Mexico around the Last Glacial Maximum. *Nature* 584:87–92.

Bennett, Matthew R., David Bustos, Jeffrey S. Pigati, Kathleen B. Springer, Thomas M. Urban, Vance T. Holliday, Sally C. Reynolds, Marcin Budka, Jeffrey S. Honke, Adam M. Hudson, Brendan Fenerty, Clare Connelly, Patrick J. Martinez, Vincent L. Santucci, and Daniel Odess
2021 Evidence of humans in North America during the Last Glacial Maximum. *Science* 373:1528–1531.

Bohannon, John

2013 Who's Afraid of Peer Review? *Science* 342:60–65.

Cajete, Gregory

2000 *Native Science: Natural Laws of Interdependence*. Clear Light Publishers, Santa Fe.

Callaway, Ewen

2015 Faked Peer Reviews Prompt 64 Retractions. *Nature*, <https://www.nature.com/articles/nature.2015.18202.pdf?origin=ppub>.

- Charger, Harry (Cheyenne River Sioux), Ione V. Quigley (Rosebud Sioux), and Ulrike Wiethaus
 2008 Foundations of Lakota Sovereignty. In *Foundations of First Peoples' Sovereignty*, edited by Ulrike Wiethaus, pp. 159–177. Peter Lang Publishing, New York.
<https://nycstandswithstandingrock.files.wordpress.com/2016/10/charger-quigley-wiethaus-2008.pdf>
- Collin, Yvette Running Horse
 2017 *The Relationship Between the Indigenous Peoples of the Americas and the Horse: Deconstructing a Eurocentric Myth*. Ph.D. dissertation, Indigenous Studies Department, University of Alaska, Fairbanks, <https://zenodo.org/record/7217326#.Y5-ChXbMKUk>.
- Cozzens, Peter
 2016 *The Earth is Weeping: The Epic Story of the Indian Wars for the American West*. Vintage Books, New York.
- de Leon, Justin
 2020 Process as Product: Native American Filmmaking and Storytelling. In *Racialized Media: The Design, Delivery, and Decoding of Race and Ethnicity*, edited by Matthew W. Hughey and Emma González-Lesser, pp.114–136. New York University Press, New York.
- Deloria Jr., Vine
 2006 *The World We Used to Live in: Remembering the Powers of the Medicine Men*. Fulcrum Publishing, Golden, Colorado.
- DeMallie, Raymond J., and Jahner, Elaine A. (editors)
 1980 *Lakota Belief and Ritual*. University of Nebraska Press, Lincoln.
- Ewen, Alexander
 2017 The Bering Strait Theory. *Indian Country Today*.
- Fenelon, James, and Jennifer Alford
 2020 Envisioning Indigenous Models for Social and Ecological Change in the Anthropocene. *Journal of World-Systems Research* 26:372.
- Ferguson, Elizabeth
 2005 Einstein, Sacred Science and Quantum Leaps: A Comparative Analysis of Western Science, Native Science and Quantum Physics Paradigm. Master's thesis, Native American Studies, University of Lethbridge, Lethbridge.
- Fixico, Donald L.
 1996 Ethics and Responsibilities in Writing American Indian History. *American Indian Quarterly* 20:29–39.
- French, Lawrence A.
 2003 Wounded Knee II and the Indian Prison Reform Movement. *Prison Journal* 83:26–37.

Gonzalez, Mario, and Elizabeth Cook-Lynn

1999 *The Politics of Hallowed Ground: Wounded Knee and the Struggle for Sovereignty*. University of Illinois Press, Urbana.

Goodman, Ronald

2017 *Lakota Star Knowledge: Studies in Lakota Stellar Theology*. Edited by Alan Seeger. SGU Publishing, Mission, South Dakota.

Greene, Jerome A.

2021 *All Guns Fired at One Time: Native Voices at Wounded Knee, 1890*. South Dakota Historical Society Press, Pierre.

Harper's Weekly Magazine

1873 *Treaty with the Indians in Olden Time*.

Helander-Renvall, Elina, and Inkeri Markkula

2017 On Transfer of Sami Traditional Language: Scientification, Traditionalization, Secrecy, and Equality. In *Indigenous Peoples' Cultural Heritage, Rights, Debates, Challenges*, edited by Alexandra Xanthaki, Sanna Valkonen, Leena Heinämäki, and Piia Nuorgam, pp. 104–129. Brill, Nijhoff. <https://brill.com/downloadpdf/book/edcoll/9789004342194/BP000006.pdf>

Ioannidis, John P. A.

2005 Why Most Published Research Findings are False. *PLoS Medicine* 2, e124, <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0020124>.

Kalt, Joseph P., and Joseph William Singer

2004 Myths and Realities of Tribal Sovereignty: The Law and Economics of Indian Self-rule. KSG Faculty Research Working Paper Series RWP04-016, SSRN Electronic Journal, <https://ssrn.com/abstract=529084>.

Kappler, Charles Joseph

1904 *Indian Affairs: Laws and Treaties*, Vol. 23. United States Congress, Senate Committee on Indian Affairs. U.S. Government Printing Office, Washington, D.C.

Kawagley, Angayuqaq Oscar.

1993 *A Yupiaq World View: Implications for Cultural, Educational, and Technological Adaptation in a Contemporary World*. Ph.D. dissertation, Department of Social and Educational Studies, University of British Columbia, Vancouver.

Koithan, Mary, and Cynthia Farrell

2010 Indigenous Native American Healing Traditions. *Journal for Nurse Practitioners* 6:477–478.

Legal Information Institute

1992 *U.S. Supreme Court, UNITED STATES, Petitioner, v. SIOUX NATION OF INDIANS et al. LII*, <https://www.law.cornell.edu/supremecourt/text/448/371>.

Lewis, Johnnye, Joseph Hoover, and Debra MacKenzie

2017 Mining and Environmental Health Disparities in Native American Communities. *Current Environmental Health Reports* 4:130–141.

McAllister, Tara G., Jacqueline Beggs, Shaun Ogilvie, Rauru Kirikiri, Amanda Black, and Priscilla M. Wehi

2019 Kua Takoto te Mānuka: Mātauranga Māori in New Zealand Ecology. *New Zealand Journal of Ecology* 43(1):1–7. <https://newzealandecology.org/nzje/3393.pdf>.

McGhee, Robert

1989 Who Owns Prehistory? The Bering Land Bridge Dilemma. *Canadian Journal of Archaeology/Journal Canadien d'Archéologie* 13:13–20.

Modaff, Daniel P.

2019 *Mitakuye Oyasin* (We Are All Related): Connecting Communication and Culture of the Lakota. *Great Plains Quarterly* 39:341–362.

Núñez, Martin A., Mariana C. Chiuffo, Aníbal Pauchard, and Rafael D. Zenni

2021 Making Ecology Really Global. *Trends in Ecology & Evolution* 36:766–799. <https://www.sciencedirect.com/science/article/abs/pii/S0169534721001774>

Peat, F. David

2005 *Blackfoot Physics: A Journey Into the Native American Universe*. Weiser Books, Boston.

Ponte, Diogo Valadas, and Lothar Schäfer

2013 Carl Gustav Jung, Quantum Physics and the Spiritual Mind: A Mystical Vision of the Twenty-First Century. *Behavioral Sciences* 3:601–618.

Resnik, David B., and Elise Smith

2020 Bias and Groupthink in Science's Peer-Review System. In *Groupthink in Science, Greed, Pathological Altruism, Ideology, Competition, and Culture*, edited by David M. Allen and James W. Howell, pp. 99–113. Springer, Cham, Denmark.

Shorter, David Delgado

2015 Spirituality. In *The Oxford Handbook of American Indian History*, edited by Frederick E. Hoxie, pp. 433–452. Oxford University Press, Oxford, <https://doi.org/10.1093/oxfordhb/9780199858897.013.20>.

Smith, Linda Tuhiwai

2013 *Decolonizing Methodologies: Research and Indigenous Peoples*. Zed Books, London.

Smith, Richard

1988 Research Policy: Problems with Peer Review and Alternatives. *British Medical Journal (Clinical Research Edition)* 296:774–777, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2545379/>.

Sundstrom, Linea

2021 Heart of the Earth: A 1940s Lakota Map of Black Hills Sacred Sites. *Great Plains Quarterly* 41:195–223. <https://muse.jhu.edu/article/854333>.

Torma, Carolyn

1986 *Gold Mining in the Black Hills: A Photographic Essay*. South Dakota State Historical Society, Pierre.

Triggle, Chris R., and David J. Triggle

2007 What is the Future of Peer Review? Why is There Fraud in Science? Is Plagiarism out of Control? Why do Scientists Do Bad Things? Is it All a Case of: “All That is Necessary for the Triumph of Evil is that Good Men do Nothing”? *Vascular Health and Risk Management* 3:39–53, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1994041/>.

Watson, Traci

2017 Is Theory About Peopling of the Americas a Bridge Too Far? *Proceedings of the National Academy of Sciences* 114:5554–5557.

Woolford, Andrew

2015 *This Benevolent Experiment: Indigenous Boarding Schools, Genocide, and Redress in Canada and the United States*. University of Nebraska Press, Lincoln.

Yellow Hair, Robert Milo

Oglala Sioux Tribe. Lives on Pine Ridge, South Dakota. Oral teaching and contextual interpretation regarding Lakota relationship with *Šungwakan*. Personal communication, April 5, 2022.

Zielske, Daniel P.

2010 Tolerance and Subjection in Native American Religious Practices. *Forum on Public Policy* 4, <https://www.forumonpublicpolicy.co.uk/2010-no4>.

