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On tap, not on top: An urgent call for academia to support Indigenous science and equitable conservation

Francisca Saavedra¹  | Robert Buschbacher²  |
 Gabriel R. Nemogá-Soto^{3,4,5,6}  | Diana Alvira⁷  | Simone Athayde⁸  |
 Jeremy M. Campbell⁹  | Andrea B. Chavez Michaelson¹⁰  |
 Jeff Ganohalidoh Corntassel¹¹  | Joel E. Correia^{12,13}  | Rachel Dacks^{14,15}  |
 Christopher P. Dunn¹⁶  | Sinomar Ferreira da Fonseca Junior¹⁷  |
 Michael C. Gavin¹⁸  | Bruce Hoffman¹⁹  | Marianne Ignace²⁰  |
 Karim-Aly Kassam²¹  | Bette Loiselle²²  | Luisa Maffi²³ | Faisal Moola²⁴  |
 Ana L. Porzecanski²⁵  | John Richard Stepp²⁶  | David Stringer²⁷  |
 Paula Ungar²⁸  | Kawika B. Winter^{14,29}  | David Zandvliet³⁰ 

¹Tropical Conservation and Development Program, University of Florida, Gainesville, Florida, USA

²Tropical Conservation and Development Program, University of Florida and Amazon-Biocultural, Gainesville, Florida, USA

³Master of Indigenous Governance Program, University of Winnipeg, Winnipeg, Canada

⁴Natural Resources Institute, University of Manitoba, Winnipeg, Canada

⁵PLEBIO Research Group, Universidad Nacional de Colombia, Bogotá, Colombia

⁶Muisca Community, Sesquilé, Colombia

⁷Legado, Jackson, New Hampshire, USA

⁸World Resources Institute, and Tropical Conservation and Development Program, University of Florida, Washington, D.C., USA

⁹Keller Science Action Center, Field Museum of Natural History, Chicago, Illinois, USA

¹⁰Tropical Conservation and Development Program, University of Florida, and Educational Partnership for Innovation in Communities EPIC-N, Gainesville, Florida, USA

¹¹Indigenous Studies, University of Victoria, Victoria, Canada

¹²Human Dimensions of Natural Resources, Colorado State University, Fort Collins, Colorado, USA

¹³Just Social-Ecological Transformations Program, Colorado State University, Fort Collins, Colorado, USA

¹⁴Biocultural Initiative of the Pacific, University of Hawai'i at Mānoa, Honolulu, Hawai'i, USA

¹⁵Department of Natural Resources and Environmental Management, University of Hawai'i at Mānoa, Honolulu, Hawaii, USA

¹⁶Cornell Botanic Gardens, Cornell University, Ithaca, New York, USA

¹⁷Tropical Conservation and Development Program & Biodiversity Institute, University of Florida, Gainesville, Florida, USA

¹⁸Human Dimensions of Natural Resources Department, Colorado State University, Fort Collins, Colorado, USA

¹⁹The Amazon Conservation Team, Falls Church, Virginia, USA

²⁰Department of Linguistics and Indigenous Studies, Simon Fraser University, Skeetchestn Community, Secwépemc Nation, Burnaby, Canada

²¹Department of Natural Resources and the Environment and American Indian and Indigenous Studies Program, Cornell University, Ithaca, New York, USA

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²²Center for Latin American Studies, and Department Wildlife Ecology and Conservation, University of Florida, Gainesville, Florida, USA

²³Terralingua, Salt Spring Island, Canada

²⁴Department of Geography, Environment and Geomatics, University of Guelph, Guelph, Canada

²⁵Center for Biodiversity and Conservation, American Museum of Natural History, New York, New York, USA

²⁶Center for Latin American Studies and Department of Anthropology, University of Florida, Gainesville, Florida, USA

²⁷Department of Second Language Studies, Indiana University, Bloomington, Indiana, USA

²⁸Tropenbos Colombia, Bogotá, Colombia

²⁹Hawai'i Institute of Marine Biology, University of Hawai'i at Mānoa, Kāne'ohe, Hawai'i, USA

³⁰Institute for Environmental Learning, Simon Fraser University, Burnaby, Canada

Correspondence

Joel E. Correia, Human Dimensions of Natural Resources Department, Colorado State University, USA.

Email: joel.correia@colostate.edu

Francisca Saavedra, Tropical Conservation and Development Program, University of Florida, Gainesville, Florida, USA.

Email: saavedra@umd.edu

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Indigenous sciences and biocultural approaches¹ offer critical pathways forward for conservation, community resurgence, restoration, and scholarship. While exclusionary conservation models have caused historical harm, displaced millions of Indigenous people (IP),² and failed to halt global biodiversity loss (Dowie, 2009), a growing body of evidence shows that conservation is more just and effective when led by IPs and Local Communities (LCs),³ whose enduring relationships with land and

water embody generations of cultural, ecological, and spiritual knowledge (Zanjani et al., 2023).⁴

As an innovative, transdisciplinary network of Indigenous and non-Indigenous researchers, educators, and practitioners, we call on academic institutions to recognize and support Indigenous sciences as central—not peripheral—to creating a sustainable future (Kimmerer & Artelle, 2024). Some of us work on biocultural approaches

¹Biocultural approach: This approach recognizes that biodiversity is interwoven with cultural diversity, and that Indigenous and local knowledge systems, languages, and lifeways are foundational to ecosystem resilience (Maffi & Woodley, 2010). Biocultural diversity recognizes that Indigenous sciences is holistic, relational, and rooted in generations of observations and practices. Its premise is that everything in a system is interconnected, as are the problems and the solutions (Winter, 2021).

²The term “Indigenous,” although used broadly by international and Indigenous organizations, has been questioned, especially in Asian countries. The distinction between Indigenous and settler populations does not always apply in Asia, where the concept also gets entangled with class and caste issues (Bétéille, 1998). The term “Indigenous” is also debated across the African continent, with many state governments arguing against inclusion/recognition in constitutions or state laws.

³The term “Indigenous Peoples,” as used in this manuscript, stands for “Indigenous and tribal,” according to the definition in Article 1 of the International Labour Organization’s Convention 169 (source: C169–Indigenous and Tribal Peoples Convention, 1989 (No. 169). Online access on April 16, 2025. https://normlex.ilo.org/dyn/nrmlx_en/?p=NORMLEXPUB:12100:0:NO::P12100_ILO_CODE:C169).

We are aware that the right to self-identification is adopted in the UN Declaration on the Rights of Indigenous Peoples <https://www.un.org/en/fight-racism/vulnerable-groups/indigenous-peoples#:~:text=NOT%20Dehumanization,strong%20link%20to%20their%20lands>.

The acronym IP&LC (Indigenous Peoples and Local Communities) is disaggregated here to “Indigenous Peoples (IPs)” and “Local

Communities (LCs)” to reflect their distinct legal statuses, rights-holders, and decision-making authorities under international human-rights law. Grouping the two terms risks collapsing rights and obligations that the UN Declaration on the Rights of Indigenous Peoples (UNDRIP) affirms for Indigenous Peoples—including collective rights, self-determination, and the right to free, prior and informed consent (FPIC)—with more generic “local community” categories that do not uniformly possess those protections. The United Nations Permanent Forum on Indigenous Issues (UNPFII) has explicitly urged a clear distinction between Indigenous Peoples and Local Communities (22nd session, 2023), and Indigenous organizations have called for retiring amalgamating labels (e.g., “IPLC/IP&LC”) where they dilute or obscure Indigenous Peoples’ internationally recognized rights. The term “Local Communities (LCs),” as used in this manuscript, does not refer to settler communities that often displace Indigenous Peoples and acquire control of the land for economic gain, but to traditional communities with a historical and cultural connection to their territories.

⁴Indigenous sciences defined by Cajete, a Tewa educator and scholar, is “that body of traditional environmental and cultural knowledge unique to a group of people which has served to sustain that people through generations of living within a distinct bioregion.” ...Knowledge generation in “Indigenous science is guided by spirituality, ethical relationship, mutualism, reciprocity, respect, restraint, a focus on harmony, and acknowledgment of interdependence. This knowledge is integrated with reference to a particular people and ‘place’ toward the goal of sustainability and perpetuation of culturally distinct ways of life through generations” (Cajete, 2020).

in our own territories, and others through long-term commitments in IP and LC territories in the Americas, Pacific Islands, Africa, and Asia. Many of us have seen that the creation and enforcement of robust ethical protocols for research on Indigenous lands and waters is far from universal and consistent. We believe that epistemic or knowledge justice, understood as the recognition of diverse ways of knowing, grows when institutions support Indigenous knowledge and biocultural conservation. This article presents a collective call for fundamental change: academia must transform the way it works if it is to meet the challenges and opportunities of biocultural conservation.

We build on an initial effort led by the University of Florida to understand the domain of biocultural conservation in academia (Saavedra, 2023); incorporate lessons from long-term collaborative efforts with IPs and LCs partners (e.g., the University of Florida's Governance and Infrastructure in the Amazon project, giamazon.org, among many others from this group); and have engaged in intercultural dialogue on partnerships among academic and Indigenous organizations from Colombia, Australia, the United States, Canada, and Mexico at the "Weaving Knowledge for Biocultural Conservation" workshop at CBD COP16 in Cali, Colombia (Ungar et al., 2025). From this work, we have codeveloped a vision of how academic institutions can meaningfully support biocultural conservation by transforming epistemic imbalances that govern environmental and biodiversity knowledge production, research practices, and curriculum development.

Too often, relationships between academia and IPs and nations remain extractive and asymmetrical, and without meaningful recognition or restitution of harm done in the name of science. As synthesized by Chavez et al. (2023), we envision three key strategies for transformation:

1. **Codesign and co-implement**—research, teaching, and outreach agendas with IPs and LCs, respecting community priorities and timelines.
2. **Braiding plural knowledge systems**—producing and sharing knowledge that draws on academic and Indigenous worldviews.
3. **Prioritize outcomes that directly benefit IPs and LCs** including territorial governance, strengthened relationships with lands, waters and more-than-human beings, capacity building, and long-term resilience.

These strategies are urgently needed, ethical, and effective alternatives to conventional paradigms (Gavin et al., 2015).

Academic institutions must recognize territories of life as knowledge centers and take practical steps to decolonize (McAllister et al., 2025). To do so, they must shift toward

co-creative, reciprocal, and respectful engagement. As Indigenous scholars have called for, academia must be "on tap, not on top" (Moko-Painting et al., 2023). This entails rethinking and challenging dominant structures to treat Indigenous knowledge systems as essential in environmental assessments, biocultural conservation, and other global knowledge processes (Huambachano et al., 2025), as well as engagements with Artificial Intelligence. Frameworks such as "Two-Eyed Seeing" developed by Mik'maq Elder Albert Marshall,⁵ which call for viewing the world through both Western and Indigenous ways of knowing (Marshall et al., 2012), are more than metaphors—they are actionable models for reimaging research, education, and practice.

These strategies cannot be implemented without transforming academic institutional structures and worldviews. Codesigning and co-implementing research and teaching involve re-centering actions to work with knowledge keepers and Elders under community-led initiatives to address their priorities. This work must also overcome power asymmetries between knowledge systems, where one system sets the standards and practices for data validation, use, ownership, and publication. Actions focused on strengthening academic institutions through strategies like "Indigenizing the Academy" (hiring and retaining Indigenous scholars and incorporating Indigenous knowledge into curricula) can have a role. Still, such actions may jeopardize community capacity to foster and transmit Indigenous knowledge if they are not centered on communities' needs and priorities. For US-based land-grant universities⁶ in particular, whose wealth derives from Indigenous lands (Geisler et al., 2022), the responsibility to strengthen communities as knowledge carriers and contributors is especially urgent.

Ultimately, academia must move beyond inclusion toward transformation. Supporting Indigenous sciences means cocreating new frameworks, not merely adding diverse voices to existing ones. This entails rethinking how knowledge is constructed, validated, and applied, while engaging with fundamental ethical questions at the heart of conservation and education. In this light, for academia to genuinely contribute to a just and sustainable

⁵The concept of Etuaptmumk or "Two-Eyed Seeing," developed by Mik'maq Elder Albert Marshall, is based on the principle that Indigenous and Western scientific ways of knowing are valuable, achievable, and inform how we live in the world. It originates from the traditional territory of the Mi'kma'ki people. The Mi'kma'ki word Etuaptmumk essentially means "the gift of multiple perspectives" (Marshall et al., 2012).

⁶Land-grant universities in the United States were established or expanded through endowments derived from the sale of lands that had been expropriated from Indigenous Peoples and later distributed to states under the Morrill Act of 1862.

future, it must embrace Indigenous sciences not as complementary but as foundational to reimagining conservation, education, and development.

AUTHOR CONTRIBUTIONS

Francisca Saavedra: Writing – original draft; writing – review and editing. **Robert Buschbacher:** Writing – review and editing. **Gabriel R. Nemogá-Soto:** Writing – review and editing. **Diana Alvira:** Writing – review and editing. **Simone Athayde:** Writing – review and editing. **Jeremy M. Campbell:** Writing – review and editing. **Andrea B. Chavez Michaelsen:** Writing – review and editing. **Jeff Ganohalidoh Corntassel:** Writing – review and editing. **Joel E. Correia:** Writing – review and editing. **Rachel Dacks:** Writing – review and editing. **Christopher P. Dunn:** Writing – review and editing. **Sinomar Ferreira da Fonseca Junior:** Writing – review and editing. **Michael C. Gavin:** Writing – review and editing. **Bruce Hoffman:** Writing – review and editing. **Marianne Ignace:** Writing – review and editing. **Karim-Aly Kassam:** Writing – review and editing. **Bette Loiselle:** Writing – review and editing. **Luisa Maffi:** Writing – review and editing. **Faisal Moola:** Writing – review and editing. **Ana L. Porzecanski:** Writing – review and editing. **John Richard Stepp:** Writing – review and editing. **David Stringer:** Writing – review and editing. **Paula Ungar:** Writing – review and editing. **Kawika B. Winter:** Writing – review and editing. **David Zandvliet:** Writing – review and editing.

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ORCID

Francisca Saavedra  <https://orcid.org/0009-0001-3207-6777>

Robert Buschbacher  <https://orcid.org/0000-0002-6727-3834>

Gabriel R. Nemogá-Soto  <https://orcid.org/0000-0003-2174-8651>

Diana Alvira  <https://orcid.org/0000-0003-1851-9516>

Simone Athayde  <https://orcid.org/0000-0002-3820-6595>

Jeremy M. Campbell  <https://orcid.org/0000-0003-1213-587X>


Andrea B. Chavez Michaelsen  <https://orcid.org/0000-0001-9469-7037>


Jeff Ganohalidoh Corntassel  <https://orcid.org/0000-0002-8234-5314>



Joel E. Correia  <https://orcid.org/0000-0002-1679-4381>

Rachel Dacks  <https://orcid.org/0000-0002-0101-3036>

Christopher P. Dunn  <https://orcid.org/0000-0001-7896-1512>

Sinomar Ferreira da Fonseca Junior  <https://orcid.org/0009-0006-8915-4090>

Michael C. Gavin  <https://orcid.org/0000-0002-2169-4668>

Bruce Hoffman  <https://orcid.org/0000-0003-4847-5163>
Marianne Ignace  <https://orcid.org/0000-0003-4393-1756>

Karim-Aly Kassam  <https://orcid.org/0000-0002-4495-8574>

Bette Loiselle  <https://orcid.org/0000-0003-1434-4173>

Faisal Moola  <https://orcid.org/0000-0001-9803-8514>

Ana L. Porzecanski  <https://orcid.org/0000-0002-5157-4579>

John Richard Stepp  <https://orcid.org/0000-0001-9594-9187>

David Stringer  <https://orcid.org/0000-0003-0006-0823>

Paula Ungar  <https://orcid.org/0000-0003-0561-9665>

Kawika B. Winter  <https://orcid.org/0000-0003-3762-7125>

David Zandvliet  <https://orcid.org/0000-0002-8978-4731>

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