Recommendations to the Department of Ecology and Evolutionary Biology at the University of Toronto, on the Decolonization of Department-Affiliated Field Work

Authors: Kayla Bazzana, Jonathan Burnie, Thomas Dudgeon, Georgia Henry, Natalia Sandoval Herrera, Maria Tocora Alonso, and Vicki Zhang

Justification

Field research is performed widely across the Department of Ecology and Evolutionary Biology (EEB) at the University of Toronto. We surveyed whether tenured or tenure-track professors in the EEB Department at the University of Toronto incorporated field work into their research programs through individual familiarity with the lab research programs, lab websites and published papers. We defined field work as performing experiments, collecting data or collecting organisms from the outdoors. For this survey we did not consider the use of collaborator-collected data as participation in field work. Over 75% of faculty were identified as incorporating field work in their research program. Additionally, EEB offers two undergraduate field courses and is a member of the Ontario University Field Biology Program, which allows undergraduates access to field courses at other Ontario universities. Overall there is a considerable amount of field research performed across the department, which has motivated us to develop guidelines for decolonizing field work in EEB.

Colonial history of field work

Field biology has a history rooted in Western colonialism which has been preserved through structural racism in academic systems. As scientists in the Department of Ecology and Evolutionary Biology at the University of Toronto, we must recognize that colonialism has led to the Euro-American centralization of how ecological and evolutionary studies have been performed throughout history (Trisos et al. 2021). By ignoring the colonial history embedded within field biology, we uphold oppressive methodologies. Recognizing the extractive tendencies of the way biological research is conducted highlights how local communities have been disenfranchised and denied their connections with their territories, and should motivate us as researchers to pursue meaningful engagement that can move the discipline forward from marginalized practices and colonial mindsets (Chaudhury and Colla 2020). We must actively decolonize fieldwork from the individual to organizational levels through increasing equity and inclusion of Indigenous communities surrounding field sites, increasing inclusion of researchers from marginalized groups, and increasing access to data for researchers from the communities where work is conducted.

Relationship with communities and local researchers

Using field sites for research without developing partnerships with local communities and researchers is a neocolonialist practice, termed “parachute science”. Members of the community surrounding the field site often perform labour and research tasks but are not appropriately compensated for their work through authorship. Intellectual collaboration with international researchers results in higher impact factor papers (Adams 2013). Scientific publications have been extensively characterized by low levels of co-authorship from members of the communities where the fieldwork is performed (Dahdouh-Guebas et al. 2003). Accordingly to Parreira et al. (2017), this may be due to geographic distance and socioeconomic factors affecting collaboration patterns. It is critical that researchers share skills, knowledge, and funding with people in the local communities where fieldwork is performed. If funding and research output remains outside of the reach of the communities surrounding field sites, research goals and conservation efforts may be diminished. In increasing support for community-driven conservation, education, and management programs, science needs local counterparts as leaders of change in their communities (de Vos, in Evans, 2017)

Relationships with marginalized researchers and students

Successful fieldwork requires training and often has hidden codes of norms. Additionally, the costs associated with participation at the undergraduate level may disproportionately reduce inclusion of marginalized individuals from lower socioeconomic backgrounds. The average cost of a field course is ~$2000 plus travel costs. Increasing access and inclusion of students and researchers from diverse backgrounds leads to diversity in perspectives and better research.

Summary

Field work has both a historic bedrock of colonialism and modern practices which perpetuate inequalities. In this document we outline general guidelines for decolonizing field work at both the departmental and instructional levels. These guidelines should be accompanied by individual self-examination and actions aimed at identifying and mitigating implicit bias which may act counter to this guide. Additional readings are included in Table S1 (Appendix).

Department-Level Recommendations

We outline here a number of approaches to guide how the EEB Department can support collaborative research between its members and local communities. Our recommendations include training in community-engaged collaborative research, the development of mutual collaborative agreements, the promotion of transparent communication and acknowledgements of community effort, and longer-term departmental initiatives. The information provided below is summarized from a larger body of literature that describes ways to foster a meaningful and sustainable partnership between academia and broader society (Bastidas et al 2010; Santos 2008, Mayan et al. 2016; Chaudhury & Colla 2020; Trisos et al 2021).

1. Offer professional training to researchers in the EEB Department.

Before conducting fieldwork, researchers should receive training in community-engaged collaborative research practices in ecology and evolutionary studies. The training should include how to achieve ethical, respectful, inclusive, and equitable research collaborations. Researchers should be trained in how to act as leaders in collaborative partnerships, how to ensure equity among diverse partners, how to avoid control by a single individual/party, and to recognize that the leadership of the project can change throughout the lifespan of the partnership (Mayan et al. 2016). Training should address a range of issues applicable to the different situations scientists face when conducting collaborative projects (Table S2, Appendix), and should provide access to additional resources available at the University of Toronto and through domestic and international entities; a list with potential useful resources is available in Table S3 (Appendix).

Training could most feasibly be offered in the form of short courses or modules. The department may also consider offering departmental workshops or seminars to discuss how we, as an academic community, can build mutually beneficial partnerships with local communities.

2. Acknowledgments of mutual participation in all research output

The EEB department should encourage researchers, both in our department and in the wider scientific community, to be instruments of institutional and social change. To this end, we propose the following initiatives:

- ➔ **Encourage co-authorship with academic members of local institutions.** In order to recognize all participants in the investigation, researchers should invite members of local communities affiliated with scientific institutions to be co-authors in any research output from the collaborative project.

- ➔ **Encourage the use of land acknowledgements and positionality statements in research output.** Information on the importance of land acknowledgements and positionality statements is provided in Table S4 (Appendix), along with resources on how to create and use them.

3. Provide support for joint collaborative research agreements

We recommend that the department provide support for the development of collaborative agreements (written and verbal) between EEB researchers and the communities impacted by the research projects. This process may start with an orientation meeting between both parties, and the final collaborative agreement should clearly state:

- ➔ **Roles and responsibilities.** The tasks and expectations placed upon everyone in the collaboration should be clearly outlined.

- ➔ **Mutual compensation**. This includes both tangible and intangible outcomes of the cooperation, such as: the inclusion of local and scientific engagement into grants, economic investment in local infrastructure, the exchange of community and scientific knowledge, and/or monetary compensation.

- ➔ **Training.** Any potential training opportunities for community members should be outlined, as well as the requirements and expectations therein.

- ➔ **Timelines.** Timeframes for the completion of each stage of the research project need to be outlined and agreed upon by all parties.

- ➔ **Publications.** As publications are the main metric utilized when valuing institutions and when assessing grant applications for research funding, co-authorship of local community members/local researchers is essential for acknowledging their contributions during the research project.

- ➔ **Data ownership.** The recognition of local sovereignty over specimens/data is one of the objectives of any decolonization effort. Researchers must aim to maintain transparent communication with the community, including discussions of local data repositories, data accessibility and interpretation, and dissemination of results.

- ➔ **Opportunity for future projects.** The potential for the data or results of the current project to be used in future studies should be outlined, in addition to the potential for involvement of local community members in future research projects.

The reciprocity inherent in these agreements implies shared responsibility, commitments, objectives, and research outputs. Throughout the process of creating these collaborative agreements, it should be made explicitly clear that all participants' time and efforts will be acknowledged by both parties and that every meeting will be based on equal voice and full disclosures (Bastidas et al. 2010).

4. Long term institutional commitment

To promote long-term change and a more permanent move towards the decolonization of fieldwork in biology, the EEB Department has a responsibility to implement initiatives that will promote a more sustainable, inclusive field. Some suggestions include:

- ➔ **Scholarships/grants/awards.** Increase the availability of grants that promote collaboration with local residents of field sites. To reduce barriers for students of lower socioeconomic status and minority groups, and to promote their increased representation in the scientific community, the EEB Department should provide bursaries or grants to partially or fully cover the costs of participation in fieldwork courses, many of which are highly cost-prohibitive and inaccessible for those from low socioeconomic or marginalized backgrounds.

- ➔ **Establishment of diversity committees.** Standing diversity committees should be established to serve as allies and informational resources during the development of collaborative projects. The committees will be tasked with ensuring that the partnerships established by members of the EEB Department include participants from different sociocultural backgrounds.

- ➔ **Promoting the development of the scientific skills of the community**. Encourage training sessions for community staff who can provide technical and intellectual support for the research project. The training provided should be transmitted broadly enough to constitute a main element of the scientific legacy EEB research has in the community and in the progress of science. Reciprocal relationships, including research/education exchange programs, should be established between EEB researchers and local community members.

- ➔ **Communicating research inclusively.** Encourage researchers to communicate their findings in a manner that is equitable, respectful, and inclusive of the community members, so that they may choose to incorporate the scientific results for future monitoring or policy-making decisions. If the community's language is not English, the university should provide aid in translating the information so it can be appropriately distributed to the community.

Instructional Level guidelines

As one of the primary functions of the EEB department is to educate future generations of scientists, it is equally important that we critically re-evaluate and decolonize not only the way we conduct our own research, but also how we teach students to conduct research. EEB provides two undergraduate field courses, providing a key opportunity to incorporate anti-colonial practices into students' experiential education. Outlined below are a number of initiatives by which the EEB Department can reduce the colonial impact of its educational practices.

1. Provide training modules for students before going to the field

We recommend that students engage with anti-colonial and anti-bias training material prior to going into the field for either research or coursework. The University of Toronto should develop their own training materials to fit the needs of the University and EEB. Some examples of appropriate training materials are provided in Table S5 (Appendix).

The main goal of any anti-colonial module or training session is to broaden the perspective of the attendees to show what harm can be done when anti-bias measures are not implemented, and what good can be done when these measures are considered. One of the larger issues to emphasize is that if local knowledge is not incorporated into the study plan, then the research project may not address a relevant question to the community (both local and academic), and key information may be missed. Examples of these errors and their repercussions are discussed by Held (2020), and the integration of objectivity with local knowledge is reviewed by Baker et al. (2019). Additionally, communication between researchers and the community is integral to forming meaningful relationships, and an emphasis must be placed on effective communication to lay people and allowing a wide range of voices to be heard from the community (Kainer et al. 2006; Parker et al. 2018).

2. Implement codes of conduct

The implementation of codes of conduct in field work is a good practice to not only provide a safe space for the participants, but also to ensure a harmonious interaction with the field site and its community. Having clear guidelines for behavior expectations during field courses can address and prevent discriminatory behaviors associated with implicit and explicit biases, which often convey colonial attitudes. Below are some example guidelines that could be incorporated into existing codes of conduct or could be used to inspire the formulation of new ones.

i. Be aware of and address your positionality, power, privileges, and values. This includes recognizing the colonial histories, cultural biases, and structural marginalization that may have led to your position within the field team.

ii. Respect the landscape where you are staying, including the land, water, plants, and animals that live there. Recognize that you are a guest and reduce your impact by following "Leave No Trace" principles. This includes making your best effort to leave the landscape how you originally found it.

iii. Respect the culture and community of the people that live on the land. Make efforts to learn the culture, and value the knowledge that the residents hold from their deep-rooted experiences with this environment. This includes respecting Indigenous and traditional knowledge holders, and explicitly asking permission to take photographs of people, and use their stories, ideas, and information.

iv. Make efforts to share data with the community and build relationships for future collaborations.

v. Students should not expect staff to maintain the living areas for them. Living areas must be kept clean by students whenever possible. This includes sleeping quarters, kitchens, and washrooms.

vi. Be respectful and considerate of others, and do not prioritize some knowledge, such as western science, over others, such as local and Indigenous knowledge.

vii. Avoid knowingly making false or misleading statement(s) (or engaging in activities) that could be or be viewed as offensive or defamatory to a team member, group, or organization

For further guidance and information, see the Association of Polar Early Career Scientist's webpage at https://www.apecs.is/career-resources/diversity-equity-inclusion /field-code-of- conduct.html.

3. Active inclusion of the local students

Fieldwork and field courses should be structured such that they do not merely consist of foreign students dropping in to learn before leaving, they should also provide an opportunity to further the education of local students. These measures will aid in furthering education in under-represented nations in academia. Providing opportunities for University of Toronto students to interact with students from local institutions can enrich their personal and research experience, and will benefit both parties. By being exposed to different realities, education programs, and research experiences, students might have different perspectives and skills that can be shared,

and help expand their research interest and approaches. The inclusion of students from local institutions acts to mitigate 'academic gatekeeping', where students from less affluent nations are less likely to join research projects or pursue careers in academia.

- ➔ **Reduce financial barriers for local students.** As an incentive for local students to join, reduced costs for accommodations should be provided for the local students wherever possible. Include sponsorship of local student participation as a fixed expense in your grants and institutional budgeting applications. Consider funding from external sponsors and/or collaborations with local institutions.

- ➔ **Place the experience in a broader societal context.** Fieldwork experiences may support learning, but it can often be disconnected from the scientific needs of the community, giving students a false sense that their work is separate from the needs of society. This lack of context can be particularly important for fieldwork conducted abroad in regions with social, political, and environmental realities different to those you know. Service learning is a pedagogical approach that allows students to engage with the needs of the community by integrating academic work with complex civic issues. Short field courses (2 weeks) have shown to have significant impacts on the students perception of environmental problems and improvement in sustainability concepts when engaging the community in the learning process (Pruett & Weigel 2020).

4. Invite local researchers/institutions to the course

Involving local researchers and institutions in the field course design and execution should be common practice in field biology courses, as it can improve the quality of knowledge and the overall experience for the students. Local researchers and members of the scientific stations, where field courses usually take place, are not only experts on the biology of the ecosystem but are familiar with the knowledge gaps and conservation challenges that need to be addressed in the region. Their knowledge can bring a valuable perspective for the students learning concepts and could help the course to have additional goals with more meaningful impact on the local community. Some ways to involve the local scientific community in the field courses are:

- ➔ **Include local scientists in the delivery of course materials.** Invite local researchers/conservationists/rangers to give talks and/or workshops to the students.

- ➔ **Develop the course as a collaborative project.** Consider running the course in collaboration with a local researcher, so that they can have a direct influence on the structure of the courses being taught in their community.

- ➔ **Build collaborations that allow local researchers to take the lead on field activities/projects.** Their guidance can help focus the students' research projects to relevant research questions and can help design long term projects.

- ➔ **Design courses with longer residency in the local community.** Consider planning long term projects that can have a bigger impact on the local conservation efforts and for which students every year could help collect data for.

- ➔ **Provide appropriate compensation.** Give credit or compensation to the local participants whether with money, knowledge, jobs, or training.

5. Invest in human capacity or infrastructure

One of the characteristics of colonial science is the way in which researchers from high-income countries or institutions go to countries or regions with lower incomes to conduct research, and do not contribute to improving the ability of the host countries or institutions to conduct science, thereby hindering science as a whole. There are many ways in which researchers and field course instructors in particular can give back to the scientific community in their host region by transferring knowledge or helping to improve infrastructure.

- ➔ **Tangible donations.** Consider giving donations to local institutions in the form of money or equipment.

- ➔ **Intangible donations.** Offer some of your time during your visit to give talks or training to local institutions, e.g., universities, research stations, conservation practitioners. Engage with the community providing environmental education activities and involve your students in the experience.

6. Use assessment tools to reinforce experiential learning

Integration and reinforcement of field trip experiences in the final stage is an important element to consider when planning the course activities. Encouraging reflection about the experience with local researchers and field work abroad could help to develop new skills, new attitudes, or new ways of thinking. This reinforcement can be done, as a group or as an individual reflection. Options for this reinforcement include post-trip debriefing session/panel discussion, self-assessment questionnaire, reflective writing pieces/journals, positionality statements, self-awareness tools and exercises, and reflexive photography. Additional resources to consider when designing field work courses, including some addressing the use of reinforcement tools, are available in Table S6 (Appendix).

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Parreira MR, Machado KB, Logares R, Felizola Diniz-Filho JA, Nabout JC. 2017. The roles of geographic distance and socioeconomic factors on international collaboration among ecologists. Scientometrics. 113: 1539–1550. DOI: 10.1007/s11192-017-2502-z

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APPENDIX

Table S1. Additional resources and references regarding the problematic history of, and decolonial challenges inherent in, biological fieldwork-based research.

RESEARCH ARTICLES
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ONLINE RESOURCES
1. International Arctic Science Committee. "Leveling the field: tips for inclusive arctic field work". Available at: https://iasc.info/news/iasc-news/370-leveling-the-field-tips-for-inclusive-arctic-field-work a. Guidelines developed from veteran field researchers asked about best practices for empowering others. Divided into (1) inclusive practices for preparing a team, (2) inclusive tasking and routines, and (3) inclusive leadership. Emphasis on onboarding and respect in order to foster a better working environment for all. 2. University of Birmingham. "Toilet stops in the field: An educational primer and recommended best practices for field-based teaching". Available at: https://drive.google.com/file/d/15mLZgZWQvBXQRU_ok7OqnpUmxKObgwAm/view a. Aimed at field course instructors/leaders. Emphasis on removing discomfort and uncertainty surrounding bodily functions in the field. Clarifying and reducing anxiety for those who have no field experience means improving the social environment for these individuals, and fosters a more inclusive environment.

3. University of Washington. “Preventing Harassment in Fieldwork Stations”. Available at: http://psc.apl.washington.edu/HLD/REIF/RespectandEqualityinFieldwork_RecommendationsandReportUW_Jan2018.pdf
    a. Specifies (i) the issue of harassment in fieldwork, and (ii) outlines areas for action across different levels of university hierarchy. Also includes a timeline for implementation of actions.
4. EOS. “Ten Steps to Protect BIPOC Scholars in the Field.” Available at: https://eos.org/opinions/ten-steps-to-protect-bipoc-scholars-in-the-field
    a. Provides a list of recommendations for institutions to implement to prepare for and mitigate against discrimination and racialized violence when performing fieldwork.

Table S2. Question bank for training sections focused on how to conduct collaborative investigation between EEB researchers and local community members and/or researchers. Every inquiry is framed in a specific stage of the collaborative agreement development between the parties.

STAGE	INQUIRIES
Training Stage	1. How can we best guarantee inclusivity, diversity and equity in fieldwork? 2. How can people living with disabilities, or those who belong to a marginalized socio-economic status actively participate in collaborative research? 3. How can we support community involvement in research? 4. How can we ethically collect, share, and communicate data? 5. How can we recognize the efforts of the community, and ensure they benefit from the research? 6. How do we acknowledge community participation? 7. How can we promote knowledge exchange, transfer, and/or co-learning between parties?

Planning Stage
 	
What do we need to know prior to negotiating a research agreement with local community members?
	1. What language does the negotiation (verbal and paper agreement) need to be in, if the language spoken by the research team differs from that of the local community?
	    a. Is a bilingual staff required to reach out to the community?
	2. What tangible benefits would the community receive from the research?
	3. Has the community faced negative consequences of previous studies in their territories?
	    a. If so, how will you ensure that you protect the community from misuse or abuse? (Engage with the

	community's history). 4. Does the research threaten or contradict any legal, ethical, social, spiritual, and political current or historical context in the community? 5. Are there any cultural practices that need to be considered when establishing the collaboration, such as cultural norms of who makes decisions for the community or who speaks on their behalf? a. If so, how will you ensure that you abide by and respect the cultural practices of the community?
Negotiation Stage What do we need to state in the research agreement in order to respect and legitimize community participation?	1. How can the community be involved in the project? a. Local training to perform fieldwork activities. b. External training at the university labs. c. Research participation acknowledgements (i.e co-authorship). 2. How will you ensure that you provide full disclosure upfront of the data you will be obtaining and analyzing? a. How can you maximize the community's autonomy in the data collection and analysis process? 3. Will the community be involved in the interpretation and dissemination of the research findings? 4. How can the researchers promote co-learning and knowledge transfer with the community members? a. Beyond the scientific papers published about the research, do the final research outputs consider presentations or hard-copy brochures to be given to the community (i.e. in schools, governmental/private institutions). 5. How will both parties resolve conflicts (conflict avoidance and management special training)? 6. How will you ensure that the community can provide fully informed consent? a. How will you communicate the necessary information so that communities without written language can provide informed consent? b. Is the community's participation truly voluntary? c. Do the community members have the right to withdraw their consent at any time during the project?
Follow-Up Stage (Research agreement renewal)	1. Is the community willing to continue with the research project? 2. Have the goals of the project changed in any way, including new ideas for use of the collected data?

Table S3. Resources available at the institutional (UofT), governmental (Government of Canada), and international (academic societies, publications) levels that may provide information useful in designing training sessions for researchers in the Department of Ecology and Evolutionary Biology at UofT.

INSTITUTIONAL LEVEL - UNIVERSITY OF TORONTO
1. The Division of the Vice-President, Research & Innovation (VPRI) (https://research.utoronto.ca/) 2. The Centre for Urban and Community Studies (CUCS) (http://www.urbancentre.utoronto.ca/) 3. INDIGENOUS U OF T (https://indigenous.utoronto.ca/research/) 4. Centre for Indigenous Studies (https://indigenousstudies.utoronto.ca/) 5. Indigenous Research Network (https://www.irn.utoronto.ca/) 6. U of T Global (https://global.utoronto.ca/) For Land-Acknowledgements: 1. Indigenous UofT: https://indigenous.utoronto.ca/about/land-acknowledgement/ 2. OISE - UofT: https://www.oise.utoronto.ca/deepeningknowledge/Teacher_Resources/Curriculum_Resources_%28by_subjects%29/Land_Acknowledgement.html 3. StudentLife UofT: http://blogs.studentlife.utoronto.ca/redefiningconference/2020/11/27/the-importance-of-meaningful-land-acknowledgements/
DOMESTIC LEVEL - GOVERNMENT OF CANADA
1. Canada Research Coordinating Committee (https://www.canada.ca/en/research-coordinating-committee.html) a. Northern Scientific Training Program Information Manual 2021-2022 (https://www.canada.ca/en/polar-knowledge/fundingforresearchers/nstp-information-manual-2021-2022.html) b. Indigenous research and research training in Canada 2019 - 2022 (https://www.canada.ca/en/research-coordinating-committee/priorities/indigenous-research/strategic-plan-2019-2022.html) 2. Social Sciences and Humanities Research Council (https://www.sshrc-crsh.gc.ca/about-au_sujet/index-eng.aspx) 3. THE INDIGENOUS GUARDIANS TOOLKIT (https://www.indigenousguardianstoolkit.ca/)
INTERNATIONAL LEVEL - ACADEMIC SOCIETIES, PUBLICATIONS, ETC.
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Table S4. Definitions, context, and resources regarding land acknowledgements and positionality statements.

Land Acknowledgements	◆ **What is a land acknowledgement?** *"The Land Acknowledgement is a formal statement recognizing the unique and enduring relationship that exists between Indigenous Peoples and their traditional territories"* (INDIGENOUS U OF T) ◆ **Why do we write land acknowledgments?**

	To recognize the land is an expression of gratitude and appreciation to those whose territory we work and live on and a way of honoring the Indigenous people who have been living and working on the land from time immemorial. It is important to understand the long-standing history that has brought you to reside on the land and to seek to understand your place within that history. Land acknowledgments do not exist in past tense or historical context: colonialism is a current ongoing process, and we need to build the mindfulness of our present participation. (The Division of Human Resources & Equity, UofT) ◆ **Whose land do you want to acknowledge?** - Native Land Digital Map (https://native-land.ca/) provides information on domestic and international indigenous communities around the world. - "Whose Land" (https://www.whose.land/en/#) provides information on indigenous territories in North America, and has the option to view territories by city. ◆ **How can I make a land acknowledgment?** - The Guide to Acknowledging First Peoples & Traditional Territory provides complete information on how to appropriately acknowledge Indigenous peoples in Canada (https://www.caut.ca/content/guide-acknowledging-first-peoples-traditional-territory). - For general information, visit "A guide to Indigenous land acknowledgment" by the Native Governance Center (https://nativegov.org/a-guide-to-indigenous-land-acknowledgment/) ◆ **Additional resources:** - Resource from OISE - UofT: https://www.angelanardozi.com/listenandlearn/2017/11/9/how-can-i-make-the-land-acknowledgement-meaningful - Acknowledgment Statements: A First Step in Reconciliation (Canadian Museum Association) https://museums.ca/site/reportsandpublications/museonline/janfeb_acknowledgementstatements - A guide to Indigenous land acknowledgment (Native Governance Center): https://nativegov.org/a-guide-to-indigenous-land-acknowledgment/ - NAHLA Land Acknowledgement, Template for Personalization, Definitions, and Speaker Protocol: https://www.chla-absc.ca/docs/NAHLALandAcnowledgement_4.pdf

	- Laurier Students' Public Interest Research Group http://www.lspirg.org/knowtheland
Positionality Statements	◆ **What is positionality?** - An individual's positionality encapsulates both their individual worldview and the position they take in regards to a particular research project and its social and political context (Holmes 2020). Our positionality is influenced by our political ideologies, religious faiths (or lack thereof), gender identity, sexual orientation, ethnicity, race, social status, socioeconomic background, abilities or disabilities, and so on (Holmes 2020). ◆ **Why is positionality important?** - Because our positionality reflects the position we choose (consciously or unconsciously) to adopt within a particular study or research context, it directly influences every step of the research process, from the questions we choose to ask, to the methods employed, to the interpretation of results. Given this, it is important that we as researchers consider the ways in which our individual positionalities can impact the work we do and the impacts we have on the communities affected by our work. Identifying our positionality requires a recognition and acknowledgement of the cultural, social, and political contexts in which we live and in which we are conducting our research; doing so demands extensive self-reflection and self-assessment, which must continue on an on-going basis throughout our careers, as our positionality is fluid and is situation- and context-dependent. ◆ **How can I use my positionality to decolonize my science?** - While positionality can be difficult to articulate, and the self-reflection required can be uncomfortable, one way in which to encourage a broader consideration of positionality within biological field-based research, and to become more aware of our own positionalities in the work we do, is to include positionality statements in scientific publications. ◆ **Additional resources** - Knaggård, Å., Ness, B., & Harnesk, D. (2018). Finding an academic space: reflexivity among sustainability researchers. Ecology and Society, 23, 20. https://www.ecologyandsociety.org/vol23/iss4/art20/

	- Holmes, A. G. (2020). Researcher Positionality - A Consideration of Its Influence and Place in Qualitative Research - A New Researcher Guide. Shanlax International Journal of Education, 8(4), 1-10. https://doi.org/10.34293/education.v8i4.3232 - Baker, K, Eichhorn, MP, Griffiths, M. Decolonizing field ecology. Biotropica. 2019; 51: 288– 292. https://doi.org/10.1111/btp.12663 - Trisos, C.H., Auerbach, J. & Katti, M. Decoloniality and anti-oppressive practices for a more ethical ecology. Nat Ecol Evol (2021). https://doi.org/10.1038/s41559-021-01460-w

Table S5. Existent training materials that can be used in the formulation of training modules specific to the EEB Department at UofT.

FROM THE UNIVERSITY OF TORONTO
1. Unconscious Bias educational Modules U of T
FROM OTHER INSTITUTIONS
1. Queen's University https://www.queensu.ca/ctl/teaching-support/decolonizing-and-indigenizing 2. University of Nottingham https://www.nottingham.ac.uk/research/groups/all-in/documents/v1-top-tips-checklist-8-.7.2020.pdf 3. Prof. Paige West, Barnard College and Columbia University https://savageminds.org/2016/07/25/teaching-decolonizing-methodologies/

Table S6. Additional resources to reference when designing and teaching fieldwork courses, including some addressing the efficacy and use of assessment tools in reinforcing experiential learning.

ON DESIGNING AND TEACHING FIELDWORK COURSES

1. Baker, K., M.P. Eichhorn, and M. Griffiths. 2019. Decolonizing field ecology. Biotropica 51: 288-292.
    a. Short commentary designed to outline the importance and practice of objectivity, local knowledge, and positionality in designing and conducting ecological field studies. Emphases include incorporating local scientists into project construction, publication, interpretation, and application.
2. Held, M.B.E. 2020. Research Ethics in decolonizing research with Inuit communities in Nunavut: The challenge of translating knowledge into action. International Journal of Qualitative Methods 19: 1-7.
    a. Case study of the authors' self-professed failures in decolonizing their research during graduate studies. They emphasize the points where they went wrong, what the repercussions were, and recommend strategies to avoid these errors in the future.
3. Kainer, K.A., M. Schmink, J.R. Stepp, H. Covert, E.M. Bruna, J.L. Dain, S. Espinosa, and S. Humphries. 2006. A framework for graduate education for tropical conservation and development. Conserv. Biol. 20:3–13.
    a. Presents a framework for graduate education that emphasizes broadening skillsets into socioecological systems, communicating in lay-people formats, and critical reflection.
4. Parker, P., D. Holland, J. Dennison, S.H. Smith, and M. Jackson. 2018. Decolonizing the academy: Lessons from the Graduate Certificate in Participatory Research at the University of North Carolina at Chapel Hill. Qualitative Methods 24(7): 464-477.
    a. Outlines the Graduate Certificate in Participatory Research at the University of North Carolina. It details critical steps to decolonizing research, primarily through stopping gatekeeping, allowing a wider range of voices to be heard, and providing training for participants and co-producers of knowledge.
5. Wilson, C. 2001. A review of "Decolonizing methodologies: Research and Indigenous peoples". https://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/journals-and-magazines/social-policy-journal/spj17/17-pages214-217.pdf
    a. Brief review of the book by L.T. Smith (1999) "Research and Indigenous Peoples" that discusses the main take-aways of the book and how it can inform non-indigenous researchers to decolonize their research practices.
6. Teaching decolonizing methodologies: https://savageminds.org/2016/07/25/teaching-decolonizing-methodologies/
    a. Website by Prof. Paige West outlining courses she has conducted on decolonizing science. She details the inspiration for the courses, their overall outline, and how and why she conducts the course to best convey the relevant material.

ON REINFORCEMENT TOOLS

1. https://www.mcgill.ca/eln/files/eln/doc_tls_assessment_of_experiential_learning.pdf
2. Lewis LH, Williams CJ. 1994. Experiential learning: Past and present. New Directions for Adult and Continuing Education, 1994(62): 5–16. Available at: http://www.sunyjcc.edu/files/Experiential%20Learning%20-%20Past%20and%20Present.pdf
3. https://www.webqda.net/the-use-of-photos-as-an-educational-tool-reflective-photography-technique-as-an-example/?lang=es