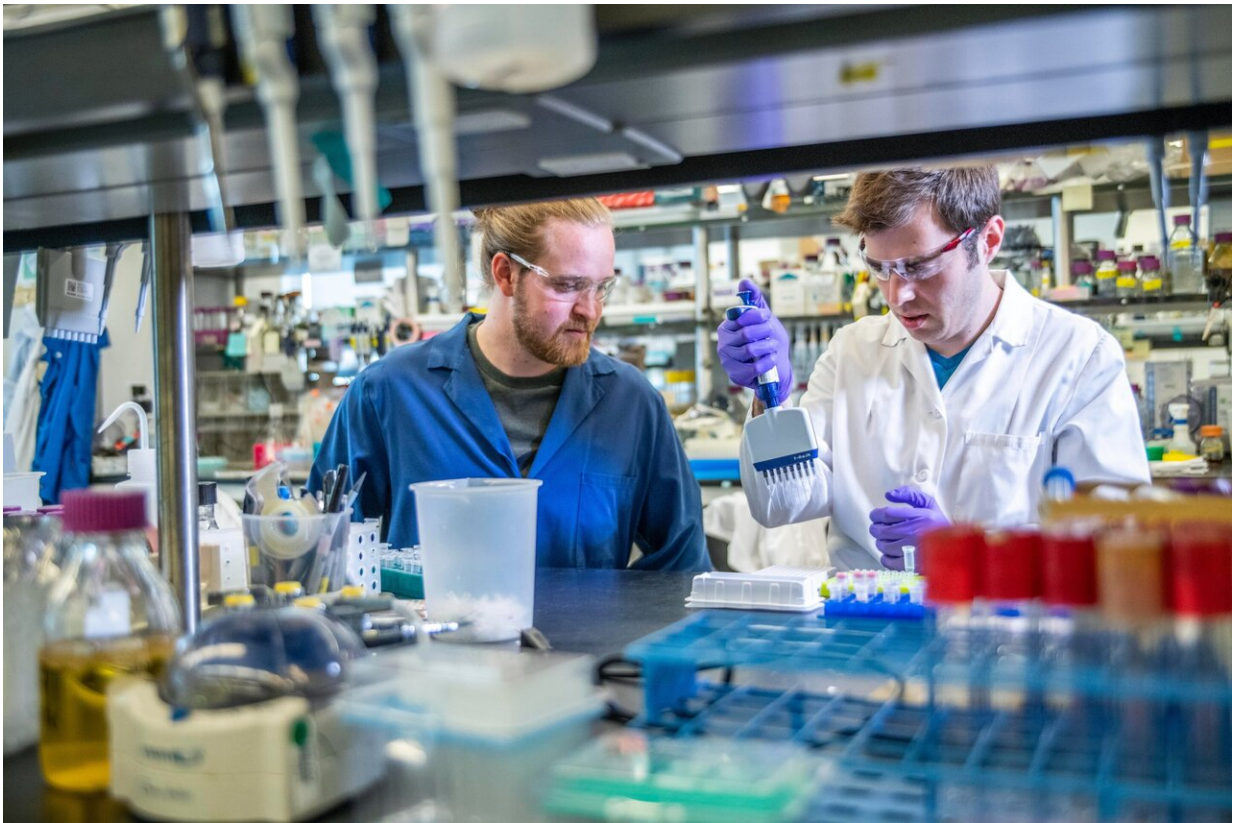


# Biodiversity collections address science workforce needs

October 27 2021

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The task of training an effective cadre of biodiversity scientists has grown more challenging in recent years, as foundational skills and knowledge in organismal biology have increasingly required

complementary data skills and knowledge. Writing in *BioScience*, Dr. Anna K. Monfils, of Central Michigan University, and colleagues identify one way to address this training conundrum: biodiversity collections. Biodiversity collections operate at the nexus of foundational biological practice and contemporary data science, a product of their role as curator of not only specimens themselves but also the specimens' associated data and network of data resources (referred to as the "extended specimen").

The authors describe a module that leverages this feature of biodiversity collections to produce a holistic student learning experience. The module, "Connecting students to [citizen science](#) and curated collections," was designed by the authors with six learning goals in mind, ranging from plant specimen [collection](#) in the field to the deposition of data in national or international databases. Students also learned about the value of large data sets and the role of community members' contributions to them.

The module was implemented and assessed in 10 courses across four universities, with 148 undergraduate and graduate students included in the data analysis. Monfils and colleagues report that the students "maintained specimen collection notebooks, used proper field collection techniques for identifying and archiving specimens, and were able to prepare and deposit quality herbarium specimens into a physical collection, as well as deposit associated specimen data into national or international databases."

The authors reported strong learning results, stating that, according to a postmodule assessment, "the students felt well prepared, very well prepared, or totally prepared to use foundational and emerging plant collecting skills including maintaining a field notebook (89%), collecting specimens in the field (94%), and depositing specimens (89%) and digital data (92%) into national and international data repositories."

Monfils and colleagues signal that these results point to the value of biology education that unites foundational skills and knowledge with data acumen in a context that is both authentic and reflective of current scientific practice: "As scientists and educators, we must embrace the changing landscape of biodiversity science and leverage the foundational skills that collections have fostered for centuries to help engage, inspire, and build the next generation of scientists."

**More information:** Anna K Monfils et al, Collections Education: The Extended Specimen and Data Acumen, *BioScience* (2021). [DOI: 10.1093/biosci/biab109](https://doi.org/10.1093/biosci/biab109)

Provided by American Institute of Biological Sciences

Citation: Biodiversity collections address science workforce needs (2021, October 27) retrieved 16 July 2024 from <https://phys.org/news/2021-10-biodiversity-science-workforce.html>

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