

Introduction to Collections and Research in Natural History Museums

ZOO6927 Section 1713 (class: 18670)

Fall 2023

2 Credit hours

General Class Information:

Course Summary

Natural history museum collections are central to research understanding many of the pressing challenges facing humanity today, including climate change, biodiversity loss, health of both humans and other organisms, and the rapid loss of language and culture. These collections are also increasingly used as foundations for facilitating civic engagement and confronting historical legacies of colonialism in sciences and society writ large.

This class will introduce students to research and collections in natural history museums, with a focus on the Florida Museum of Natural History (FM) at the University of Florida. Each week we will engage with faculty and staff in the FM to discuss of-the-moment topics related to the operations, management, use, and ethics of scientific museum collections and related research. Throughout the course, students will learn how natural history museum collections and research are relevant to careers, disciplines, and discoveries both within and beyond museums themselves—including the research and career aspirations represented among the enrolled students.

This course is ideal for any graduate student interested in natural history museum research, collections, and resources (e.g., digitization), affiliated natural history disciplines (e.g., anthropology, biology, geology, education), as well as museum studies more broadly. Early-career graduate students are especially encouraged to participate to learn more about FM resources that may support their dissertation research.

The course will primarily be conducted in-person and include behind-the-scenes tours of the FM research and collections facilities.

Course Meetings

Tuesday, Periods 3,4,5 (9:35 AM – 12:35 PM)

The course will meet once week in-person or via Zoom (please see schedule below). Readings will be distributed each week by Canvas.

Instructor

Dr. David C. Blackburn

Curator of Herpetology & Associate Chair

Florida Museum of Natural History

Email: dblackburn@flmnh.ufl.edu

Office hours: Tuesday 1:00 – 2:00 PM. In person: Dickinson 262 (check in at reception desk)

Grading and Exams

Grades will be based on attendance and active participation in **all** class meetings, including discussions.

Students will be expected to do any reading of any course materials **before** each class; readings will be distributed via Canvas. Before each class meeting, students will submit two questions based on the readings.

As part of learning about natural history museum science (including its transdisciplinary relevance, applications beyond museums, and communicating museum-based science to the public), students

will complete **one term paper** (3–5 single-spaced pages in length; 1-inch margins; 12-point Times New Roman font; numbered pages; standardized professional references cited formatting) about a topic related to the course, pending approval from the course instructor by **October 13, 2023**. The instructor is also willing to consider proposals for term papers that represent interdisciplinary collaborations among two or three students in the course. Students have an option to turn in a first draft of the term paper on or before **November 17, 2023** for feedback from the instructors. A final version of the term paper will be due by our last day of the course on **December 50, 2023**.

Break-down of grades:

Attendance: 30% (2 pts./class, 30 pts.)

Participation: 30% (2 pts./class, 30 pts.)

Weekly questions: 10% (1 pts./class, 15 pts.)

Term paper: 30% (30 pts.)

Attendance Policy

Students are expected to attend all classes. Absences will be excused per UF Attendance Policy (<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/#absencestext>). In the case of illness, we will require a doctor's note provided within 1 week or if previously arranged with the instructor.

For classes meeting Zoom, if you are unable to connect to the video conference due to technology issues, options will be available to call in and participate by phone.

*Please see additional UF Policies we will follow at bottom of syllabus.

Course Details: *Weekly Schedule*

Week 1:

August 29: Introduction to course; guest: Doug Jones (Director, Florida Museum [FM])
Location: Carr Hall, Room 0222

Assigned Readings:

Das S, Lowe M. 2018. Nature Read in Black and White: decolonial approaches to interpreting natural history collections. *Journal of Natural Science Collections* 6: 4–14.

Marshall A. 2020. What is a Museum? A dispute erupts over a new definition.
<https://www.nytimes.com/2020/08/06/arts/what-is-a-museum.html?smid=em-share>

Meineke EK, Davies TJ, Daru BH, Davis CC. 2018. Biological collections for understanding biodiversity in the Anthropocene. *Phil. Trans. R. Soc. B* 374: 20170386.
<http://dx.doi.org/10.1098/rstb.2017.0386>

2022–2025 Florida Museum of Natural History Strategic Plan:
<https://www.floridamuseum.ufl.edu/wp-content/uploads/sites/12/2022/06/Florida-Museum-2022-2025-Strategic-Plan.pdf>

Recent Florida Museum of Natural History Annual Report:
<https://www.floridamuseum.ufl.edu/feature/annualreport21-22/>

Other Suggested Readings:

Rocha LA et al. 2014. Specimen collection: an essential tool. *Science* 344: 814–815.
<https://doi.org/10.1126/science.344.6186.814>

Tseng M, El-Sabaawi RW, Kantar MB, Pantel JH, Srivastava DS, Ware JL. 2020. Strategies and support for Black, Indigenous, and people of colour in ecology and evolutionary biology. *Nature Ecology & Evolution*. <https://doi.org/10.1038/s41559-020-1252-0>

Winker K, Withrow JJ. 2013. Small collections make a big impact. *Nature* 493: 480.

Week 2:

September 5: Herbarium

Tour: Herbarium, guest: Alan Franck (Collections Manager, FM Herbarium)
Location: Dickinson Hall, meet in lobby on 3rd floor (street level)

Assigned Readings:

Kemp C. 2017. *The Lost Species: Great Expeditions in the collections of natural history museums*. Introduction (pp. xii–xxi) and Chapter 23 (pp. 193–198.)

Willis CG et al. 2018. Phylogenetic patterns of species loss in Thoreau’s woods are driven by climate change. *Proceedings of the National Academy of Sciences USA* 105: 17029–17033.

Yost JM et al. 2020. The California Phenology Collections Network: using digital images to investigate phenological change in a biodiversity hotspot. *Madroño* 66: 130–141. <https://doi.org/10.3120/0024-9637-66.4.130>

Week 3:

September 12: Lepidoptera

Tour: McGuire Center, guest: Andrei Sourakov (Collections Coordinator, FM McGuire Center for Lepidoptera & Biodiversity)

Location: Powell Hall, meet at reception desk

Assigned Readings:

Kharouba HM, Lewthwaite JMM, Guralnick R, Kerr JT, Vellend M. 2018. Using insect natural history collections to study global change impacts: challenges and opportunities. *Philosophical Transactions of the Royal Society B*, 374: 20170405. <http://dx.doi.org/10.1098/rstb.2017.0405>

Short AEZ, Dikow T, Moreau CS. 2018. Entomological collections in the age of Big Data. *Annual Review of Entomology* 63: 513–530. <https://doi.org/10.1146/annurev-ento-031616-035536>

Please also browse:

Example of outreach by Andrei Sourakov: <https://www.floridamuseum.ufl.edu/andrei-sourakov/activities/kaye/>

Week 4:

September 19: Digital Imaging Division

Tour: 2D and 3D Imaging Labs, guest: Zach Randall (Biological Scientist, FM Digital Imaging Division Collection Manager) and Ed Stanley (Associate Scientist, FM Director of Digital Imaging Division)

Location: Dickinson Hall, meet in lobby on 3rd floor (street level)

Assigned Readings:

Hedrick BP, Heberling J, Meineke EK, Turner KG, Grassa CJ, Park DS, Kennedy J, Clarke JA, Cook JA, Blackburn DC, Edwards SV, Davis CC. 2020. Digitization and the future of natural history collections. *BioScience* 70: 243–251. <https://doi.org/10.1093/biosci/biz163>

Magnani M, Douglass M, Schroder W, Reeves J, Braun DR. 2020. The digital revolution to come: photogrammetry in archaeological practice. *American Antiquity* 85: 737–760. <https://doi.org/10.1017/aaq.2020.59>

Medina JJ et al. 2020. A rapid and cost-effective pipeline for digitization of museum specimens with 3D photogrammetry. *PLoS ONE* 15(8): e0236417 <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0236417>

Sweeney PW et al. 2018. Large-scale digitization of herbarium specimens: development and usage of an automated, high-throughput conveyor system. *Taxon* 67: 165–178.

Other Suggested Readings:

Hipsley CA, Sherratt E. 2019. Psychology, not technology, is our biggest challenge to open digital morphology data. *Scientific Data* 6: 41.

Richards-Risetto, H. 2017. What can GIS and 3D mean for landscape archaeology? *Journal of Archaeological Science*. 84:10–21.

Ziegler MJ, Perez VJ, Pirlo J, Narducci RE, Moran SM, Selba MC, Hastings AK, Vargas-Vergara C, Antonenko PD, MacFadden BJ. 2020. Applications of 3D paleontological data at the Florida Museum of Natural History. *Frontiers in Earth Sciences* 8: 600696.

Week 5:

September 26: Natural history museum ethics and permits

Tour: Discussion with Coleman Sheehy (Collections Manager, Herpetology; FM CITES permitting), Elise LeCompte (FM Anthropology Registrar), Katie Smith (FM NAGPRA Coordinator)

Location: Carr Hall, Room 0222

Assigned Readings:

Lacey Act: U.S. Fish and Wildlife Service Office of Law Enforcement.

<https://www.fws.gov/le/pdf/le/Lacey.pdf>

The Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 U.S.C.

3001-3013) <https://www.ecfr.gov/cgi-bin/text-idx?SID=4190db928ef02ce24445b2992b4b6eac&mc=true&node=pt43.1.10&rgn=div5>

Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity.

<https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf>

Graham M, Murphy N. 2010. NAGPRA at 20: Museum Collections and Reconnections. *Museum Anthropology* 33: 105–124. DOI: 10.1111/j.1548-1379.2010.01090.

Other Suggested Reading:

Kansa E. et al. 2013. On Ethics, Sustainability, and Open Access in Archaeology. Decolonizing the Smithsonian: museums as microcosms of political encounter. *The SAA Archaeological Record* September: 15–22.

Week 6:

October 3: Fluid collections

Tour: FM Special Collections Building: David Blackburn (Curator, FM Herpetology) and guest, John Slapcinsky (Collection Manager, FM Invertebrate Zoology)

Location: Powell Hall, meet at reception desk

Assigned Readings:

Ruane S, Austin CC. 2017. Phylogenomics using formalin-fixed and 100+ year-old intractable natural history specimens. *Molecular Ecology Resources* 17: 1003–1008.

Simmons J. 2014. Chapter 1: The History of Fluid Preservation. *Fluid Preservation. A Comprehensive Reference*. Pp. 3–25.

Other Suggested Readings:

Simmons J. 2014. Chapter 2: Fixation. *Fluid Preservation. A Comprehensive Reference*. Pp. 26–47.

Simmons J. 2014. Chapter 3: Preservation. *Fluid Preservation. A Comprehensive Reference*. Pp. 48–72.

Week 7:

October 10: Mammalogy

Tour: Mammalogy, guest: Verity Mathis (Collections Manager, FM Mammalogy)

Location: Dickinson Hall, meet in lobby on 3rd floor (street level)

Assigned Readings:

Colella JP et al. 2021. Leveraging natural history biorepositories as a global, decentralized, pathogen surveillance work. *PLOS Pathogens* 17: e1009583.

<https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1009583>

Cook JA and JE Light. 2019. The emerging role of mammal collections in 21st century mammalogy. *Journal of Mammalogy* 100: 733–750.

<https://academic.oup.com/jmammal/article/100/3/733/5236805>

Week 8:

October 17: FM Exhibits and Public Programming (EPP), FM Thompson Earth Systems Institute (TESI), Science of Museum Education

Tour: EPP and TESI, guests: Darcie MacMahon (Director, FM Exhibits and Public Programming), Megan Ennes (Assistant Curator, FM Museum Education; Director, TESI)

Location: Powell Hall

Assigned Readings:

Abramowitz, B. et al. 2021. Science in School: Transforming K-12 outreach through scientist teacher partnerships. *Journal of STEM Outreach* 4(1): 1–14.

<https://www.jstemoutreach.org/article/30219-science-in-school-transforming-k-12-outreach-through-scientist-teacher-partnerships>

Ennes, M. et al. 2021. Museum-based online learning one year after COVID-19 museum closures. *Journal of Museum Education* 46(4): 467–480.

<https://www.tandfonline.com/doi/pdf/10.1080/10598650.2021.1982221>

Mujtaba T. et al. 2018. Learning and engagement through natural history museums. *Studies in Science Education* 54(1): <https://www.tandfonline.com/doi/full/10.1080/03057267.2018.1442820>

Other Suggested Reading:

Walker WS. 2013. The universal museum: Shaping cultural exhibition at the Smithsonian. In *The Smithsonian and the Transformation of the Universal Museum*. University of Massachusetts Press, Boston.

Wintle C. 2016. Decolonizing the Smithsonian: museums as microcosms of political encounter. *The American Historical Review* 121: 1492–1450.

Week 9:

October 24: Florida Archaeology (and Ethnography)

Tour: North Florida Archaeology, South Florida Archaeology, Historical Archaeology, and Environmental Archaeology, guests: Neill Wallis (Associate Curator, North Florida Archaeology), Jen Green (Collections Manager, South Florida Archaeology), Nicole Fuller (Collections Manager, Environmental Archaeology)

Location: Dickinson Hall, meet in lobby on 3rd floor (street level)

Assignment due: Paper topics due to instructors

Assigned Readings:

Cobb CR, Waters GJ. 2022. Lithic technological traditions at three Franciscan mission communities. *Florida Anthropologist* 75: 105–118.

Cordell A et al. 2017. Comparative clay analysis and curation for archaeological pottery studies. *Advances in Archaeological Practice* 5: 93–106. <https://doi.org/10.1017/aap.2016.6>

St. Amand F et al. 2020. Leveraging legacy archaeological collections as proxies for climate and environmental research. *Proceedings of the National Academy of Sciences USA* 117: 8287–8294

<https://www.pnas.org/doi/full/10.1073/pnas.1914154117Amand>

Please also browse:

DINAA website: <http://ux.opencontext.org/archaeology-site-data/>

ArchaeoGLOBE Project. 2019. Archaeological assessment reveals Earth's early transformation through land use. *Science* 365: 897–902.

Other Suggested Readings:

Miller SE, Murray EJ. 2018. Heritage monitoring scouts: engaging the public to monitor sites at risk across Florida. *Conservation and Management of Archaeological Sites* 20: 234–260. <https://doi.org/10.1080/13505033.2018.1516455>

Murphy C, Fuller DQ. 2017. The future is long-term: Past and current directions in environmental archaeology. *AAA General Anthropology Bulletin of the General Anthropology Division* 24: 1–10.

Week 10:

October 31: Biodiversity and Cultural Informatics

Tour: Discussion with Rob Guralnick (Curator, FM Biodiversity Informatics) and Arthur Porto (Assistant Curator, FM Artificial Intelligence for Cultural and Biological Diversity)

Location: Carr Hall, Room 0222

Assigned Readings:

Lefebvre MJ, Brenskelle L, Wiczorek J, Kansa SW, Kansa EC, Wallis NJ, King JN, Emery KF, Guralnick R. 2019. ZooArchNet: connecting zooarcheological specimens to the biodiversity and archeology data networks. *PLoS ONE* 14: e01215369. <https://doi.org/10.1371/journal.pone.0215369>

Lürig MD, Donoughe S, Svensson EI, Porto A, Tsuboi M. 2021. Computer vision, machine learning, and the promise of phenomics in ecology and evolutionary biology. *Frontiers in Ecology and Evolution* 9: 642774 <https://doi.org/10.3389/fevo.2021.642774>

Week 11:

November 7: Genetic Resources

Tour: Genetic Resources Repository, guest: Pam Soltis (Distinguished Curator, FM Genetic Resources Repository; Director, UF Biodiversity Institute)

Location: Carr Hall, Room 0222; followed by short tour in Dickinson Hall

Assigned Readings:

Austin RM et al. 2019. Opinion: To curate the molecular past, museums need a carefully considered set of best practices. *Proceedings of the National Academy of Sciences USA* 116: 1471–1474.

Card DC, Shapiro B, Giribet G, Moritz C, Edwards SV. 2021. Museum Genomics. *Annual Review of Genetics* 55: 633–659. <https://doi.org/10.1146/annurev-genet-071719020506>

Wade L. 2018. To overcome decades of mistrust, a workshop aims to train Indigenous researchers to be their own genome experts. *Science*. <https://www.science.org/content/article/overcome-decades-mistrust-workshop-aims-train-indigenous-researchers-be-their-own>

Other Suggested Reading:

Yeates et al. 2016. Museums are biobanks: unlocking the genetic potential of the three billion specimens within the world's biological collections. *Science* 18: 83–88.

Week 12:

November 14: Invertebrate Paleontology and Paleobotany

Tour: Invertebrate Paleontology and Paleobotany, guests: Roger Portell (Collection Manager, FM Invertebrate Paleontology) and Hongshan Wang (Collection Manager, FM Paleobotany)

Location: Dickinson Hall, meet in lobby on 3rd floor (street level)

Assigned Readings:

Dalton R. 2008. Palaeontology: School of rock. *Nature* 455: 858–860.

<https://www.nature.com/articles/455858a>

Kusnerik KM, Means GH, Portell RW, Kannai A, Monroe MM, Means R, Kowalewski M. 2022. Long-term shifts in faunal composition of freshwater mollusks in spring-fed rivers of Florida.

Frontiers in Ecology & Evolution 10: 851449. <https://doi.org/10.3389/fevo.2022.851499>

Marshall CR et al. 2018. Quantifying the dark data in museum fossil collections as palaeontology undergoes a second digital revolution. *Biology Letters* 14: 20180431.

<http://dx.doi.org/10.1098/rsbl.2018.0431>

Please also browse:

iDigPaleo website: <https://idigpaleo.org/>

Member Bylaw on Ethics Code, Society of Vertebrate Paleontology: <https://vertpaleo.org/code-of-conduct/>

Other Suggested Reading:

Karim TS et al. 2016. Digitization workflows for paleontology collections. *Palaeontologica Electronica* 19.3.4T: 1–14.

Week 13:

November 21: No class, Thanksgiving Break, all students received full credit for the class

Week 14:

November 28: Decolonial Approaches to Museums

Tour: Class Discussion

Location: Carr Hall, Room 0222

Assignment due: Paper topics due to instructors

Assigned Readings:

Mohammed RS et al. 2022. Colonial legacies influence biodiversity lessons: How past trade routes and power dynamics shape present-day scientific research and professional opportunities for Caribbean scientists. *The American Naturalist* 200(1): 140-155.

<https://www.journals.uchicago.edu/doi/full/10.1086/720154>

Rodriguez JA. 2020. Decolonizing or recolonizing? The (mis)representation of humanity in natural history museums. *History of Anthropology Review*. <https://histanthro.org/notes/decolonizing-or-recolonizing/>

Other Suggested Readings:

Kinsley RP, Middleton M, Moore P. (2016). (Re)Frame: The Case for New Language in the 21st Century Museum. *Exhibition* 36: 56–63.

Week 15:

December 5: Class wrap-up: The future of natural history museum collections, research, exhibits, and education

Location: Carr Hall, Room 0222

Assignment due: Term paper

Assigned Readings:

Naggs F. 2022. The tragedy of the Natural History Museum, London. *Megataxa* 7: 085-112.
<https://www.biotaxa.org/megataxa/article/view/megataxa.7.1.2>

Rohwer VG et al. 2022. Declining growth of natural history collections fails future generations. *PLOS Biology* 20: e3001613.
<https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001613>

Shultz AJ. 2020. Natural history collections are critical resources for contemporary and future studies of urban evolution. *Evolutionary Applications* 14: 233-247.
<https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/eva.13045>

University of Florida Policy Statements

Grades and Grade Points

For information on current UF policies for assigning grade points, see:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Absences and Make-Up Work

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Academic Honesty

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

The Honor Pledge:

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: On my honor, I have neither given nor received unauthorized aid in doing this assignment.

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action.

For more information regarding the Student Honor Code, please see:

<https://sccr.dso.ufl.edu/process/student-conduct-code/>

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or

criminal penalties for the individual violator.

Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352- 392-1575, www.counseling.ufl.edu/cwc/
Counseling Services Groups
and Workshops Outreach and
Consultation Self-Help Library
Training Programs
- U Matter We Care, www.umatter.ufl.edu/
- Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty- student disability related issues. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

0001 Reid Hall, 392-8565, www.dso.ufl.edu/drc/

Student Complaints

Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See <http://www.distance.ufl.edu/student-complaint-process> for more details.

Sexual Harassment

It is the policy of The University of Florida to provide an educational and working environment for its students, faculty, and staff that is free from sex discrimination and sexual harassment. In accordance with federal and state law, the University prohibits discrimination on the basis of sex, including sexual harassment. Sex discrimination and sexual harassment will not be tolerated, and individuals who engage in such conduct will be subject to disciplinary action. The University encourages students, faculty, staff, and visitors to promptly report sex discrimination and sexual harassment. If you believe you have been subjected to sex discrimination or sexual harassment please report the incident to me or any University official, administrator, or supervisor. The Office of Human Resource Services investigates all complaints. Incidents should be reported as soon as possible after the time of their occurrence (larry-ellis@ufl.edu).