

# TCD RESEARCH METHODS: DATA COLLECTION & MANAGEMENT (LAS 6292)

Spring 2023 | Class No. 21946

**Instructor:** Dr. Emilio M. Bruna (he/him; <http://brunalab.org/emilio-m-bruna/>)

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**Class sessions:** Tuesday, Periods 3-5 (9:35 am - 12:35 pm) in 376 Grinter Hall

**Drop-in Hours:** Wednesday and Thursday 10:00-11:40 pm in the Tropical Ecology & Conservation Lab (directions at <http://brunalab.org/contact-find-us/>) or via Zoom (the link is on class canvas page). You can sign up for an appointment in advance here: <https://embruna.youcanbook.me/>); you don't have to do so, but it guarantees a specific time slot so you don't have to wait in line.

**Course Objectives:** This course is a practical introduction to methods, tools, and best practices for collecting, organizing, managing, and visualizing qualitative and quantitative data. It is designed for graduate students from all disciplines at any stage of their program. **At the conclusion of the course students will be able to:**

1. Describe the different types of research data;
2. Explain the need for and benefits of data management and sharing;
3. Describe and implement best practices for the collection, storage, management, archiving, and sharing of research data;
4. Find, download, and analyze publicly available data from repositories;
5. Carry out simple and reproducible data corrections and data set organization;
6. Describe public policies and agency requirements for data management and sharing;
7. Articulate the major legal and ethical considerations regarding data collection, use, and storage (e.g., privacy/human subjects, intellectual property, international law);
8. Create and Implement Data Management Plan in funder-specific formats;
9. Identify and properly use tools for more efficient and secure data collection in the field.

**Course Format:** This course is taught (mostly) as an active-learning workshop. Students are expected to complete reading or watch some short video lectures prior class. The in-class session will typically include an opportunity to ask questions about the pre-class materials and for me to demonstrate challenging concepts; occasionally there will be a class discussion about the reading. Most of the session, however, will be spent working - sometimes in groups, sometimes individually - on exercises that reinforce the session's concepts and techniques. During class I will be circulating between groups to assist with the assignment, work through mistakes, and discuss how the techniques can be applied to your research.

## Course Materials:

1. *Required Textbook:* None. All readings will be provided online.
2. *Course Web Page:* Class materials & assignments are on the class website (<https://las6292.netlify.app/>). Assignments are submitted via Canvas (<https://elearning.ufl.edu>).

## COURSE OUTLINE & CRITICAL DATES

Week	Dates	Topic
1	1/10	'Data' across disciplines and the Research Data Life Cycle
2	1/17	File Formats, Naming Conventions, Data Storage & Security
3	1/24	Structure & Format of Data & Datasets
4	1/31	Reproducible Data (Re)organization
5	2/7	QA/AC 1: Data Entry & Validation
6	2/14	QA/QC 2: Correction & Synthesis with Open Refine
7	2/21	QA/QC 3: Visualizing Data (to Find Mistakes)
8	2/28	Documentation: Metadata & Codebooks
9	3/7	Data Management Plans
10	3/14	No Class - Spring Break
11	3/21	Efficient Data Collection
12	3/28	Transcription & Translation
13	4/4	Paperless Data Collection
14	4/11	Automated Data Extraction
15	4/18	Legal & Ethical Issues
16	4/25	Data Sharing, Reuse, & Archives
Finals Week	5/1	Submission of Final Projects by 5 pm

## ASSIGNMENTS & EVALUATION

**Final Course Grades:** Course grades will be based on the percentage of total points earned and will be assigned with the following scale: **A:** >93% **A-:** 92-90% **B+:** 89-87% **B:** 86-83% **B-:** 82-80% **C+:** 79-77% **C:** 76-73% **C-:** 72-70%. **D+:** 69-67% **D-:** 62-60% **E:** 59% and below. **The final course grade is based on the following assignments:**

Assignment	Points	Due
Weekly in-class exercises	600	Friday 9 am
DMP Peer Review	50	21 March
Data Management Plan	200	28 March
Peer Code Review	100	4 April
Individual Data Cleanup Project	600	1 May
<b>TOTAL</b>	<b>1500</b>	

**Note that there is no Final Exam in this course** (the Individual Project is due on the scheduled date of the final exam). **Note also that each of the 15 in-class exercises are each worth 40 points.** Most of the in-class assignments involve hands-on practice with data collection or manipulation. In some weeks, however, assignment will be the submission of questions for group discussion or brief reflection on the issues from the readings. Most in-class assignments

are designed to be completed during the class session, but to ensure students master the concepts rather than rush through them *they can be submitted anytime before 9 am the following Friday.*

## COURSE & UF POLICIES

**Attendance:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>. Though attendance is not required, most of the required assignments are completed in class. They are designed so that one could complete them independently, but by doing them in class you will benefit from working collaboratively with the other students.

**Participation:** Consistent informed, thoughtful, and considerate class participation is encouraged. If you have personal issues that prohibit you from joining freely in class discussion, e.g., shyness, language barriers, etc., that is no problem! Let me know as soon as possible and we will discuss alternative modes of participation. ***If you need to miss an upcoming class for whatever reason (e.g., conference, illness, family emergency), please let me know as soon as possible.*** We will make arrangements for you to complete any assignments and go over any material you will be missing. I would much rather you focus on your health or supporting friends and family in need than struggle to turn in assignments.

**Absences and Make-Up Work:** Requirements for class attendance and coursework are consistent with university policies found at: <https://catalog.ufl.edu/graduate/regulations/#text>.

**Regrades:** Requests for re-evaluation of any quizzes, exams, or assignments will only be considered if accompanied by a letter explaining why you think you deserve additional credit and the number of additional points you think you deserve. The deadline for submitting these requests is one week after the work has been returned.

**Grade Points:** For information on how UF assigns grade points, visit: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

**Course Evaluation:** Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [www.ufl.bluera.com/ufl/](http://www.ufl.bluera.com/ufl/). Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

**University Honesty Policy:** UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and

the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

**In-Class Recording: Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled.**

The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

**A “class lecture” is:** an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

**Publication without permission of the instructor is prohibited.** To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code

**Student Privacy** There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights.

**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.

**Sexual Harrasment:** UF provides an educational and working environment for its students, faculty, and staff that is free from sex discrimination and sexual harassment. For more about UF policies regarding harassment: <http://www.dso.ufl.edu/studentguide/studentconductcode.php#s4041>. \*\*\_Sexual harassment will not be tolerated.\*\*

## UF SUPPORT SERVICES

**Students Requiring Accommodation:** Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. *I want you to do well in this class and will gladly work with you to implement any necessary accommodations.*

**Students in Crisis:** Students experiencing crises or personal problems that interfere with their general well-being 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.

- **U Matter, We Care:** If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.
- **Counseling and Wellness Center:** Visit the [Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as non-crisis services.
- **Student Health Care Center:** Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the [Student Health Care Center website](#).
- **University Police Department:** Visit [UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).
- **UF Health Shands Emergency Room / Trauma Center:** For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the [UF Health Emergency Room and Trauma Center website](#).
- **Food insecurity:** The Hitchcock Field and Fork Pantry can provide food and toiletries for students experiencing food insecurity. Pantry is a resource on the University of Florida campus committed to eradicate food insecurity (<https://pantry.fieldandfork.ufl.edu/>). Food insecurity is not having a reliable access to nutritious foods for yourself on a regular basis. If you, or anyone you know is experiencing food insecurity, the Pantry is a resource to visit.

### Academic Resources

- **E-learning technical support:** 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).
- **Career Connections Center:** Reitz Union, 352-392-1601. <https://career.ufl.edu/>. Career assistance and counseling.
- **Library Support:** <https://uflib.ufl.edu/find/ask/> Various ways to receive assistance with respect to using the libraries or finding resources.

- **Teaching Center:** Broward Hall, 392-2010 or 392-6420. <https://teachingcenter.ufl.edu/> General study skills and tutoring.
- **Writing Studio:** 302 Tigert Hall, 846-1138. <https://writing.ufl.edu/writing-studio/> Help brainstorming, formatting, and writing papers.

## WEEKLY READING ASSIGNMENTS

*subject to change based on the research interests of students enrolled in the course*

### Week 2: File Formats, Naming Conventions, Data Storage, and Data Security.

#### Read:

1. Jan Čurn. 2014. How a bug in Dropbox permanently deleted my 8000 photos. [\[read online\]](#) [\[download pdf\]](#)
2. Panzarino, M. 2012. How Pixar's Toy Story 2 was deleted twice, once by technology and again for its own good. TNW. [\[read online\]](#) [\[download pdf\]](#)
3. Hart EM et al. (2016) Ten Simple Rules for Digital Data Storage. PLoS Comput Biol 12(10): e1005097. [\[read online\]](#) [\[download pdf\]](#)

#### Watch:

1. E. Bruna: [How To Name Your Files](#)
2. E. Bruna: [How to Organize Your Files](#)
3. E. Bruna: [How to Store and Backup Your Files](#)

### Week 3: Data structure & format of data and datasets

#### Read

1. Tesi, W. 2020. An Outdated Version of Excel Led the U.K. to Undercount COVID-19 Cases. Slate. [\[read online\]](#) [\[download pdf\]](#)
2. Stolberg et al. 2020. CDC Test Counting Error Leaves Epidemiologists 'Really Baffled'. NY Times. [\[read online\]](#) [\[download pdf\]](#)
3. Broman, K. W., & Woo, K. H. (2018). Data organization in spreadsheets. The American Statistician, 72(1), 2-10. [\[read online\]](#) [\[download pdf\]](#)
4. Johnson, B. D., Dunlap, E., & Benoit, E. (2010). Organizing "mountains of words" for data analysis, both qualitative and quantitative. Substance Use & Misuse, 45(5), 648-70. [\[read online\]](#) [\[download pdf\]](#)

### Week 4: Reproducible data (re)organization

#### Read:

1. Laskowski, 2020. What to do when you don't trust your data anymore. [\[read online\]](#) [\[download pdf\]](#)
2. Pennisi, E. 2020. Spider biologist denies suspicions of widespread data fraud in his animal personality research. Science. [\[read online\]](#) [\[download pdf\]](#)

3. Alston, J. M., and Rick, J. A.. 2020. A Beginner's Guide to Conducting Reproducible Research. Bull Ecol Soc Am 00( 00):e01801. [\[read online\]](#) [\[download pdf\]](#)
4. Wilson G, Bryan J, Cranston K, Kitzes J, Nederbragt L, Teal TK (2017) Good enough practices in scientific computing. PLoS Comput Biol 13(6): e1005510. [\[read online\]](#) [\[download pdf\]](#)

**Watch:**

1. [A Data Sharing and Management Snafu in 3 Short Acts](#), by the NYU Health Sciences Library

**Week 5: QA/QC 1: Data Entry & Validation****Read:**

1. Kamentez, A. 2018. The School Shootings that weren't.NPR [\[read online\]](#) [\[download pdf\]](#)
2. Lincoln, Matthew D. 2018. "Best Practices for Using Google Sheets in Your Data Project." [\[read online\]](#) [\[download pdf\]](#)

**Week 6: QA/QC 2: Correction & Synthesis with Open Refine**

**Read:** *No readings this week.*

**Week 7: QA/QC 3: Finding Errors with Data Visualization.****Read:**

1. Rougier NP, Droettboom M, Bourne PE (2014) Ten Simple Rules for Better Figures. PLoS Comput Biol 10(9): e1003833. [\[read online\]](#) or [\[download pdf\]](#)

**Watch:**

1. Tommy McCall: [The simple genius of a good graphic](#)
2. R. Luke DuBois: [Insightful human portraits made from data](#)

**Week 8: Documentation: Metadata, Codebooks****Read:**

1. Michener, W.K., et al . 1997. Non-geospatial metadata for the ecological sciences. Ecological Applications 7: 330–342. [\[read online\]](#) [\[download pdf\]](#)
2. Pp 446-450 in Bernard, H.R. and Bernard, H.R., 2013. Social research methods: Qualitative and quantitative approaches. Sage. [\[\[download pdf\]\]](#)

**Week 9: Data Management Plans****Read**



1. Michener, W. K. (2015). Ten simple rules for creating a good data management plan. PLoS Computational Biology, 11(10), e1004525. [\[read online\]](#) or [\[download pdf\]](#)
2. Goodman A, et al. (2014) Ten Simple Rules for the Care and Feeding of Scientific Data. PLoS Comput Biol 10(4): e1003542. [\[read online\]](#) or [\[download pdf\]](#). this paper connects what we've done with what's coming up next

**Watch**

1. [Content of a DMP](#)" (by RWTH Aachen University)

**Week 10: Spring Break****Week 11: Efficient data collection****Read:**

1. Redman, T. 2016. Bad Data Costs the U.S. \$3 Trillion Per Year. Harvard Business Review. [\[read online\]](#) [\[download pdf\]](#)

**Watch**

1. Atul Gawande's TED Talk: [The Importance & Value of the CHECK LIST](#).
2. Animated summary of [The Checklist Manifesto](#).
3. Jess Stratton's LinkedIn Learning Video Overview: "Use Google Forms to Create Surveys" (7 min.). Watch it [here](#); must be on UF computer or use UF proxy.
4. OPTIONAL: The more advanced, multi-video "Google Forms Essential Training Course". These short (1-3 min) videos explain each step in more detail. It's great, and only 39 min long from start to finish. Watch [here](#); must be on UF computer or use UF proxy.

**Week 12: Transcription & Translation****Read:**

1. Bakker, Rebecca. "Transcription Tools and Software" (2017). Works of the FIU Libraries. 62. [\[read online\]](#) [\[download pdf\]](#)
2. Watch "The Text Wash team discusses text anonymization" [\[link\]](#); related blog post [\[link\]](#)

**Watch**

1. Dr. Jarek Kriukow: How to transcribe interviews - [Part 1: "naturalism" and "denaturalism"](#)
2. Dr. Jarek Kriukow: How to transcribe interviews - Part 2: [Which approach to use?](#)

**Week 13: 'Paperless' data collection****Read:**

1. Aanensen DM, Huntley DM, Feil EJ, al-Own F, Spratt BG (2009) EpiCollect: Linking Smartphones to Web Applications for Epidemiology, Ecology and Community Data Collection. PLoS ONE 4(9): e6968. [\[read online\]](#) [\[download pdf\]](#)
2. Moylan, CA et al. 2013. Increasingly mobile: How new technologies can enhance qualitative research. Qualitative social work: research and practice, 14(1):36-47. [\[read online\]](#) [\[download pdf\]](#)
3. Teacher, Amber G. F. et al. Smartphones in ecology and evolution: a guide for the app-rehensive. Ecology and Evolution 3(16):5268– 5278 [\[read online\]](#) [\[download pdf\]](#)

**Watch**

1. E. Bruna: [Paperless Data Collection](#)

Great EpiCollect tutorials by UConn's David Dickson

1. [Intro to EpiCollect 5](#)
2. [Creating an EpiCollect PROJECT](#)
3. [Creating a FORM for your EpiCollect Project](#)
4. [Collecting data in EpiCollect with your phone or tablet](#)

**Week 14: Automated data extraction****Read:**

1. Drinkwater, R. E., Cubey, R. W., & Haston, E. M. (2014). The use of Optical Character Recognition (OCR) in the digitization of herbarium specimen labels. PhytoKeys, (38), 15-30. [\[read online\]](#) [\[download pdf\]](#)
2. Joo, Jungseock and Zachary C. Steinert-Threlkeld. 2019. Image as data: Automated visual content analysis for social science. [\[read online\]](#) [\[download pdf\]](#)

**Week 15: Legal and Ethical Issues >Read:**

1. de Koning M, Meyer B, Moors A, Pels P. 2019. Guidelines for anthropological research: Data management, ethics, and integrity. Ethnography. 20(2):170-174. [\[read online\]](#) [\[download pdf\]](#)
2. Katie Fortney, UC Office of Scholarly Communication. 2016. "Who owns your data?" [\[read online\]](#) [\[download pdf\]](#)
3. Goodluck, K. 2020. Indigenous data sovereignty shakes up research. High Country News. [\[read online\]](#) [\[download pdf\]](#)

4. Woodbury, R. B., Beans, J. A., Hiratsuka, V. Y., & Burke, W. (2019). Data Management in Health-Related Research Involving Indigenous Communities in the United States and Canada: A Scoping Review. *Frontiers in genetics*, 10, 942. [[read online](#)] [[download pdf](#)]

**Watch**

1. NIH: %5BStatistical methods for protecting data confidentiality](<https://youtu.be/3vN-6A2zbsk>)
2. Patricia Jenkinson Video Seminar: [Ethics in Human Subject Research](#)
3. US Department of Health & Human Services: [Informed Consent Overview](#)
4. Australian Council for International Development (ACFID): [Principles and Guidelines for Ethical Research and Evaluation in Development](#)

**Week 16: Data Sharing, Reuse, & Archives****Read:**

1. Alexander, S.M., Jones, K., Bennett, N.J. et al. Qualitative data sharing and synthesis for sustainability science. *Nat Sustain* 3, 81–88 (2020). [[read online](#)] [[download pdf](#)]
2. Renaut, S. et al. 2018. Management, Archiving, and Sharing for Biologists and the Role of Research Institutions in the Technology-Oriented Age. *BioScience* 68(6)400–411 [[read online](#)] [[download pdf](#)]
3. Duke, Clifford S., and John H. Porter. 2013. “The ethics of data sharing and reuse in biology.” *BioScience* 63(6): 483-489. [[read online](#)] [[download pdf](#)]
4. Tenopir, C., et al. (2015). Changes in data sharing and data reuse practices and perceptions among scientists worldwide. *PloS one*, 10(8), e0134826. [[read online](#)] [[download pdf](#)]
5. Mauthner, NS, & O. Parry O. 2009. Qualitative data preservation and sharing in the social sciences: On whose philosophical terms?. *Australian J of Social Issues* 44(3):291-307. [[read online](#)] [[download pdf](#)]