Data Visualization for Life Sciences Research
BINF 8750 – Spring 2026
Fridays 1:15 PM - 2:35 PM, Davison Life Sci B121

Instructor: Holly Bik – hbik@uga.edu, 706-542-2844, Marine Sciences 102

Description: Exploration of best practices for data visualization across biomedical and life science disciplines. Through hands-on exercises and real-world case studies, students will develop skills for displaying research data in compelling visual formats. Emphasis will be placed on translating data into compelling narratives that resonate with diverse audiences, with a particular focus on developing informative figures for peer-reviewed manuscripts and scientific presentations.

Learning outcomes: Upon successful course completion, students will be able to:

- Students will be able to discuss the fundamental principles of data visualization and their importance in communicating complex biological concepts effectively.
- Students will be able to examine various types of biological data, including molecular, ecological, and genomic data, and differentiate suitable visualization techniques in each category.
- Students will be able to implement best practices for data cleaning, preprocessing, and data wrangling to prepare biological data for visualization.
- Students will be able to compare and contrast the most common data visualizations used to highlight specific biological trends and patterns.
- Students will be able to select and critique techniques for effectively incorporating color, labels, and annotations to enhance the interpretability of visualizations while avoiding common pitfalls.
- Students will be able to describe and use the principles of data storytelling and how to create compelling narratives using different visualizations.
- Students will be able to appraise ethical considerations and best practices in data visualization, including accurately representing data, avoiding biases, and ensuring data privacy.

Topical Outline:

1. Why is data visualization so important?
2. Bad visualizations, and what they can teach us about best practices
3. Principles of effective data storytelling
4. Color theory and its application in life sciences visualizations
5. Overview of common visualization tools and software
6. Overview of common types of charts, plots, and graphs
7. Design principles for creating clear and informative charts and graphs
8. Tips and tricks for labels, annotations, and figure organization
9. Ethical considerations in data communication and visualization
10. AI and machine learning-driven visualization
11. Case studies on specialized visualization tools and techniques in the life sciences

Course Logistics:

- **Location:** Davison Life Sciences (B121); hybrid participation options available on request only, at the request of the student and subject to instructor approval. All students are expected to attend every class in person.
- **Logistics:** This is a 1-credit hour course. Class will meet on Fridays at 1:15pm for a total of 15 hours (i.e. we will only meet for 10 class sessions).
- **Grading:** The grade will be S/U, Satisfactory/Unsatisfactory, based on attendance, class participation and a few homework assignments.
- **Attendance:** is mandatory. If an absence is needed to attend a conference or because you are ill/contagious please email the instructor ahead of the class that will be missed. Assignments will still be due at an arranged date.
- **Textbooks for the Class:** Students are not required to purchase a textbook for this class – we will primarily be using the Wilke open-source textbook which is freely available online (and any additional chapter readings will be posted as PDFs):
    - Wilke, Claus O. (2019) Fundamentals of Data Visualization: A primer on making informative and compelling figures, O'Reilly Publishing. E-Book freely available here: https://clauswilke.com/dataviz/
    - Healy, Kieran (2019) Data Visualization: A practical introduction, Princeton University Press. (selected chapter readings will be posted on eLC)
- **Website for the class:** This class will use eLC for course materials: https://uga.view.usg.edu/

Classroom Schedule:

Week	Date	Instructor	Topic
1	**Jan 16**	Bik	Class introductions; The good, the bad, and the ugly of data visualizations; software tools
2	**Jan 23**	Bik	Telling a story and making a point
3	**Jan 30**	Bik	Aesthetics, "branding", and types of data
4	**Feb 6**	Bik	Color and Accessibility
5	**Feb 13**	Bik	Whitespace, captions, and typography
6	**Feb 20**	Bik	A tour of scientific plot types (part 1)
7	**Feb 27**	Bik	A tour of scientific plot types (part 2)
-	**Mar 6**	NO CLASS	SPRING BREAK
-	**Mar 13**	NO CLASS	--
8	**Mar 20**	Bik	Maps and geospatial data visualizations
9	**Mar 27**	Bik	Plot reproducibility and coding considerations: R markdown, ggplot, Quarto, version control
10	**Apr 3**	Bik	Final Presentations

Mental Health and Wellness Resources: If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit *https://sco.uga.edu*. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services. UGA has several resources for a student seeking mental health services (https://www.uhs.uga.edu/bewelluga/bewelluga) or crisis support (https://www.uhs.uga.edu/info/emergencies). If you need help managing stress anxiety,

relationships, etc., please visit BeWellUGA (https://www.uhs.uga.edu/bewelluga/bewelluga) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center. Additional resources can be accessed through the UGA App.

University Honor Code and Academic Honesty Policy: Students will be expected to abide by the UGA honor code in all aspects of this course. All work must be original and the student's own work. Prior research must be cited in accordance with academic standards. Students must be prepared to demonstrate knowledge and be prepared to discuss all topics, as individuals in the class. Students are expected to perform their work independently, and will be graded individually. However, students are encouraged to collaborate when preparing for class and to engage in critical reading of each other's writing. Any infringements of the honor code that come to the instructor's attention will be remanded to Academic Affairs for disciplinary action.

UGA Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at www.uga.edu/ovpi.

Accessibility and Testing: Students needing academic accommodations should: 1) register with and provide documentation to Accessibility and Testing (https://accessibility.uga.edu/); 2) bring a letter to the instructor from Accessibility and Testing indicating you need academic accommodations. This should be done within the first week of class.

Use of Artificial Intelligence (AI) in this course: UGA's policy is that the use of AI for coursework is not permitted unless explicitly authorized by me (your course instructor) ahead of time. To ensure you develop and master the foundational knowledge skills in this course, the use of generative AI tools is strictly prohibited. This includes all stages of your work process, even the preliminary ones. This prohibition extends to AI writing and image generation tools like Grammarly, Wordtune and DALL-E, as well as GAI tools like ChatGPT, Copilot, Claude, Gemini, Writesonic, Rytr, and Rtutor. If you are uncertain about using a particular tool to support your work, please consult with me before using it.

Disclaimer: The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.