Syllabus: SIO 221C, Data Analysis Laboratory (2014)

Sarah Gille
Class Meetings: Tuesday and Thursday, 12:30-1:50, OAR Conference Room
SIO Office: Nierenberg Hall 348
Telephone: 822-4425   *e-mail:* sgille@ucsd.edu
Course website: http://www-pord.ucsd.edu/~sgille/sio221c
Grading: S/U

Course Objectives: Students refine data analysis skills by carrying out projects that employ specific techniques and by discussing data analysis problems with the group.

Course requirements: Complete 3 projects from list below. In order to keep everybody on the same page, the first project should involve spectral analysis, the second can be objective mapping or EOFs, and the third will be free choice (and may be arranged with instructor to be tailored to research). Each project is scheduled to take 3 weeks. Report on progress at each class meeting and discuss problems and possible solutions with the group. Bring graphics or code to share for each class meeting. Written reports are submitted at the end of each project.

Written reports should include text and figures, with sufficient detail to allow you and your classmates to reconstruct the work that you have done. Although you may wish to put together slides to present to the class, the presentation alone does not constitute a report. As in any scholarly writing, you must acknowledge your sources using proper scientific citations. (You might find useful resources on the web, that could prove difficult to cite formally, but please provide as much information as possible.) Your report should clearly indicate the specific sources of facts and opinions that you draw from other sources. You should also follow the strictest guidelines for quotation: if you draw more than three consecutive words verbatim from a source, place them in quotation marks and identify the source. You will be asked to submit your report via turnitin.com, which provides a plagiarism check, and you will be allowed to see the plagiarism report so that you can evaluate how you've done.

Schedule:
— Organization and Introduction: October 2

— Project 1 (spectral methods): October 7, October 9, October 13, October 17, October 21, October 23. (Written reports due October 23.)

— Project 2 (EOFs or objective mapping): November 4, November 6, November 10, November 13, November 18, November 20. (Written reports due November 20.)

— Project 3: November 25, December 2, December 4, December 9, December 11. (Written reports due December 11.)

No class meeting October 28, October 30 (travel), November 27 (Thanksgiving Day).
Rescheduled classes: (October 14 shifted to October 13; October 16 shifted to October 17; November 11 shifted to November 10).

Projects
• Time series and spectra

- — Complex Demodulation
- — Salinity Spiking
- — Filtering and Assessing Resolution
- — Wind-Driven Currents
- — Wind-Driven Geostrophic Currents
- — Wavelets

- Empirical Orthogonal Functions

  - — Empirical Orthogonal Functions
  - — EOFs with Missing Data

- Objective Mapping

  - — Objective Mapping
  - — Objective Mapping (with Anisotropic Decorrelation Functions)
  - — Geostrophic Velocity

- Other

  - — Box Inverse
  - — Probability Density Functions

Reference materials
Consult the web site for a list of books that have been placed on reserve for this class. Most reserve materials should be available through the SIO grad office or in e-book format.

Other reference materials, including links to software and summaries of lecture notes, will be posted to the course web site.