

BIOLOGY/OCEAN SCIENCES 7000
GRADUATE CORE SEMINAR COURSE - Being a Researcher in the Biological Sciences
Fall 2019

Class Time – Monday 9:00 – 11:00 am

Location – CW Andrews Conference Room (SN-3125A)

Audience: mandatory for all graduates as they enter graduate school

Instructor: Ian Fleming and Paul Marino

E-mail: ifleming@mun.ca, pmarino@mun.ca; Phone 864-3586, 864-4339

Office Hours: By appointment – please email or call to set up an appointment. Please list subject line as Biol/OCSC7000

Purpose:

The objectives of the course are to: (1) explore what it is to be a graduate student at Memorial University; (2) gain an understanding of the process underlying science and the significant ethical issues that confront a biologist; (3) explore the “culture” and responsibilities of modern research and science (such as responsibility to society, etc); and (4) develop, draft and present a *preliminary* research proposal for the M.Sc. or Ph.D degree (to be peer reviewed).

The course will address scientific philosophy, research ethics, grant and research writing and presentation, accessing resources and support, safety and training requirements during research activities, budgeting, and career strategies.

Format:

The class format will be participatory discussions, case studies, visiting speakers and student seminars. PhD students will be expected to lead at least one discussion on a topic of relevance to the course. This topic can come from within or outside those listed below.

Reading for each class will be posted on the Brightspace (formerly D2L) course site.

Student Evaluation:

As the course is pass or fail, evaluation is based on class participation and successful completion and presentation of a *preliminary* research proposal, as well as the constructive review of other student proposals.

TOPICS

- | | |
|---------|--|
| Topic 1 | Welcome to Memorial University of Newfoundland (MUN); Field and Lab Safety, and Responsibilities – MUN regulations, training and applications. |
| Topic 2 | What it means to be a graduate student (resources, support, etc) & Student-supervisor relationships and communication |

- Topic 3 Funding & Proposal Writing – the funding world and how to write a great grant proposal, writing your thesis proposal and generating a budget.
- Topic 4 Scientific Writing and Publication Strategies (authorship issues; review process).
- Topic 5 Accessing and making use of Library and Electronic Resources.
- Topic 6 Time Management (& PhD student lead discussions).
- Topic 7 How to Prepare Talks & Posters (& PhD student lead discussions).
- Topic 8 Integrity in the Practice of Science.
- Topic 9 Science & Society: Communicating Science to Society.
- Topic 10 Careers after Graduate School (invited guests; preparing CV; bargaining).

Classes 11-12 Pre-proposal seminars (15 minute talk; review and discussion = 30 min/student).

Some Selected Readings:

- Amir, D. 2018. Modest advice for new graduate students. Medium
<https://medium.com/@dorsaamir/modest-advice-for-new-graduate-students-b0be6b8dbc22>)
- Blickley, J.L., Deiner, K., Garbach, K., Lacher, I., Meek, M.H., Porensky, L.M., Wilkerson, M.L., Winford, E.M. and Schwartz, M.W. 2012. Graduate student’s guide to necessary skills for nonacademic conservation careers. *Conservation Biology* 27: 24-34.
- Cassey, P. and Blackburn, T.M. 2003. Publication rejection among ecologists. *Trends Ecol. Evol.* 18: 375-376.
- Chapnick, A. 2009. How to ask for a reference letter. University Affairs. March 9, 2009.
- Clapman, P. 2005. Publish or perish. *Bioscience* 55: 390-391.
- Council of Science Editors. 2012. Authorship and authorship responsibilities.
<https://www.councilscienceeditors.org/resource-library/editorial-policies/white-paper-on-publication-ethics/2-2-authorship-and-authorship-responsibilities/>)
- Del Solar, R.G. and Marone, L. 2001. The “freezing” of science: consequences of dogmatic teaching of ecology. *BioScience* 51: 683-686.
- Everham, E.M. 1994. Strategies for the academic job hunt. *Bulletin of the Ecological Society of America* 75: 150-153.
- Fleming, N. 2018. How to give a great talk. *Nature* 564: S84-S85.
- Galindo-Leal, C. 1996. Explicit authorship. *Bulletin of the Ecological Society of America* 76: 219-220.
- Hayer, C-A., Kaemingk, M., Breeggemann, J.J., Dembkowski, D., Deslauriers, D. and Rapp, T. 2013. Pressures to publish: catalysts for the loss of scientific writing integrity. *Fisheries* 38: 352-355.
- Huey, R.B. 1987. Reply to Stearns: some acynical advice for graduate students. *Bulletin of the Ecological Society of America* 68: 150-153.
- Harley, C.D.G., Hixon, M.A. and Levin, L.A. 2004. Scientific writing and publishing – a guide for students. *Bulletin of the Ecological Society of America* 85: 74-78.
- Heard, S.B. 2014. On whimsy, jokes and beauty: can scientific writing be enjoyed. *Ideas in Ecology and Evolution* &:64-72. (doi:10.4033/iee.2014.7.14.f)

- Hochberg, M.E., Chase, J.M., Gotelli, N.J., Hastings, A. and Naeem, S. 2009. The tragedy of the reviewer commons. *Ecology Letters* 12: 2-4.
- Isaak, D.J. and Hubert, W.A. 1999. Catalyzing the transition from student to scientist – a model for graduate research training. *Bioscience* 49: 321-326.
- Jenkins, S.H. 2008. How do graduate students in ecology choose a research problem? *Bulletin of the Ecological Society of America*. October 2008: 401-406.
- Kearns, H. and Gardiner, M. 2011. The care and maintenance of your adviser. *Nature* 469: 570.
- Koshland, D. 2007. Cha-cha-cha theory of scientific discovery. *Science* 317: 761-762.
- Kuyper, B.J. 1991. Bringing up scientists in the art of critiquing research. *Bioscience* 41: 248-250.
- Lanyon, S. 1995. How to design a dissertation project. *Bioscience* 45:40-42.
- Lertzman, K. 1995. Notes on writing papers and theses. *Bulletin of the Ecological Society of America* 75: 86-90.
- Loehle, C. 1990. A guide to increased creativity in research – inspiration or perspiration? *Bioscience* 40: 123-129.
- Mack, R.N. 1987. Writing with precision, clarity and economy. *Bulletin of the Ecological Society of America* 67: 31-35.
- McPeck, M.A., DeAngelis, D.L., Shaw, R.G., Moore, A.J. et al. 2009. The golden rule of reviewing. *American Naturalist* 173: E155-E158.
- Mensh, B. and Kording, K. 2017. Ten simple rules for structuring papers. *PLOS Computational Biology* <http://doi.org/10.1371/journal.pcbi.1005619>
- National Academy of Science. 2009. On being a scientist: a guide to responsible conduct in research, third edition. National Academies Press, Washington.
(<https://www.nap.edu/catalog/12192/on-being-a-scientist-a-guide-to-responsible-conduct-in>)
- National Science Foundation. A guide for proposal writing.
(<http://www.nsf.gov/pubs/2004/nsf04016/nsf04016.pdf>)
- Neff, B.D. and Olden, J.D. 2006. Is peer review a game of chance? *BioScience* 56: 333-340.
- Neff, B.D. and Olden, J.D. 2010. Not so fast: inflation in impact factors contributes to apparent improvements in journal quality. *BioScience* 60: 455-459.
- Nelson, M.P. and Vucetich, J.A. 2009. On advocacy by environmental scientists: what, whether, why, and how. *Conservation Biology* 23: 1090-1101.
- NSERC. Tips on applying for an NSERC scholarship or fellowship. (http://www.nserc-crsng.gc.ca/Students-Etudiants/Videos-Videos/SFTips_eng.asp)
- O'Connor, C.M. 2012. How to find a good graduate advisor and make the most of graduate school. *Fisheries* 37: 126-128.
- Olson, R. 2009. Top five tips for communicating science. *New Scientist*. 1 October 2009.
(<https://www.newscientist.com/article/dn17893-top-five-tips-for-communicating-science/>)
- Rosenzweig, M.L., Davis, J.I. and Brown, J.H. 1988. How to write an influential review. *Bulletin of the Ecological Society of America* 69: 152-155.
- Russo, G. 2011. Aspirations and anxieties – Nature’s international student survey reveals changing career preferences – and a need for inspiring mentors. *Nature* 475: 533-535.
- Sand-Jensen, K. 2007. How to write consistently boring scientific literature. *Oikos* 116: 723-727.
- Schofield, T.M. 2013. On my way to being a scientist. *Nature* 497: 277-278.
- Schwartz, M.A. 2008. The importance of stupidity in scientific research. *Journal of Cell Science* 121: 1771.
- Smith, J., Myers, J. and Myer Smith, I. 2007. Tips for effective communication in ecology. *Bulletin of the Ecological Society of America* 88: 206-215.

Stanford University Career Development Center. Academic job search.

(<https://web.stanford.edu/class/inde231/Academic%20Job%20Search%202005-06.pdf>)

Stearns, S.C. 1987. Some modest advice for graduate students. *Bulletin of the Ecological Society of America* 68: 145-150.

Thompson, J.N. 2019. On being a successful graduate student in the sciences. (<https://cpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/4/216/files/2019/08/On-being-a-successful-graduate-student-v-9.0.pdf>)

Weltzin, J.F., Belote, R.T., Williams, L.T., Keller, J.K. and Engel, E.C. 2006. Authorship in ecology: attribution, accountability, and responsibility. *Frontiers in Ecology* 4: 435-441.

Zudkerberg, B. 2008. Overcoming “analysis paralysis.” *Front Ecol Envir* 6: 505-506.

Other Source Materials:

- Gosling, P. and Noordam, B. 2006. *Mastering your PhD: Setting goals for success*. Springer-Verlag, Berlin. 154 pp.
- Chakrabarty, P. 2012. *A guide to academia; getting into and surviving grad school, postdocs and a research job*. Wiley-Blackwell, Chichester, UK.
- Day, R.A. and Gastel, B. 2006. *How to write and publish a scientific paper*, sixth edition. Greenwood Press.
- Firestein, S. 2012. *Ignorance – how it drives science*. Oxford University Press, Oxford. 195 pp.
- Heard, S.B. 2016. *The scientist’s guide to writing: how to write more easily and effectively throughout your scientific career*. Princeton University Press, Princeton. 320 pp.
- *How to give a great poster* (<http://www.swarthmore.edu/NatSci/cpurrin1/posteradvice.htm>)
- Miller, A.B. 2009. *Finish your dissertation once and for all! How to overcome psychological barriers, get results, and move on with your life*. American Psychological Association, Washington, DC.
- National Academies of Sciences. 2017. *Communicating science effectively: a research agenda*. The National Academies Press, Washington. (doi: 10.17226/23674) (<https://www.nap.edu/catalog/23674/communicating-science-effectively-a-research-agenda>)
- Sneider, R. and Larner, K. 2009. *The Art of Being a Scientist, a Guide for Graduate Students and their Mentors*. Oxford University Press.
- Howard Hughes Medical Institute and Burroughs Wellcome Fund. 2006. *Making the Right Moves: a Practical Guide to Scientific Management for Postdocs and New Faculty* (<https://www.hhmi.org/science-education/programs/making-right-moves>)
- Capri, A. and Egger, A.E. 2009. *Scientific Ethics*. Visionlearning Vol. POS-2. (<https://www.visionlearning.com/en/library/Process-of-Science/49/Scientific-Ethics/161/reading>)
- Barnes, S.L. 2007. *On the market: strategies for a successful academic job search*. Lynne Rienner Publishers, Boulder. 207 pp.
- Kelsky, K. 2015. *The professor is in: the essential guide to turning your Ph.D. into a job*. Three Rivers Press, NY. 438 pp.

NOTE: Assigned readings will, in part, be from the above literature.

The following statement is in regard to Memorial University’s commitment to accommodation of students with disabilities:

“Memorial University of Newfoundland is committed to supporting inclusive education based on the principles of equity, accessibility and collaboration. Accommodations are provided within

the scope of the University Policies for the Accommodations for Students with Disabilities (www.mun.ca/policy/site/policy.php?id=239). Students who may need an academic accommodation are asked to initiate the request with the Glenn Roy Blundon Centre at the earliest opportunity (www.mun.ca/blundon).”

The following statement is in regard to Memorial University’s policy on academic integrity:

“Students are expected to adhere to those principles which constitute proper academic conduct. A student has the responsibility to know which actions, as described under Academic Offences in the University Regulations, could be construed as dishonest or improper. Students found guilty of an academic offence may be subject to a number of penalties commensurate with the offence including reprimand, reduction of grade, probation, suspension or expulsion from the University. For more information regarding this policy, students should refer to the University Regulations for Academic Misconduct (Section 6.12) in the University Calendar.