



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

Skills for Team Science

1 credit

MEES

609C

Spring 2022

Course Objectives / Overview

This professional development course focuses on providing students with the inter-personal skills for ensuring that projects and other activities that rely on a team science approach are effective, successful, and rewarding. Team science is rapidly becoming the norm for how research and problem solving is done in science. Students entering the academic, government, non-governmental organization, and private sector will frequently be involved with various types of group efforts. In some cases, they will be charged with leading these team science efforts. Often, the power of these teams is their high diversity in the disciplines of the members, which brings additional challenges to ensuring these efforts are successful. The “Science of Team Science” is rapidly emerging field and this course will use recently developed ideas in lectures and readings that include philosophy and case studies about environmental and marine sciences. The material will provide the students with both a broad conceptual understanding of the benefits and challenges of team science and practical ways to encourage and ensure that the team science efforts are effective.

Expected Learning Outcomes

Students will be able to:

- 1) Understand the current trends in research, especially related to team science in environmental and marine sciences
- 2) Determine the organizational structure and operations of a team
- 3) Recognize the roles played by team members, including themselves
- 4) Anticipate both the strengths and weaknesses of team members, and of the overall team, to ensure the functioning of the team
- 5) Reflect on they act, communicate, and behave to ensure trust and belonging within the group

Course Assessment / Grading

Mid-term paper	35%
Term paper	65%

Readings: Students will read assigned readings prior to the lecture topics. Each assignment will consist of about 3-4 papers or chapters from books.

INSTRUCTOR DETAILS:

Kenneth Rose

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410-221-8255

CLASS MEETING DETAILS:

Dates: Friday

Times: Noon to 12:50

Access: ZOOM

CURRICULUM FULLFILMENT:

Professional Development

Prerequisites

None

Teaching Assistant

N/A

Term papers: Students will write a mid-term paper (about 3-5 pages) and an end-of-term paper (5 pages). The mid-term paper will be a mini-review of a topic relevant to the science of team science. The final paper will be a personalized plan on how the student will implement the course content for their future involvement with team science. Students will be given the opportunity to discuss their papers with the instructor to clarify any questions about content.

Final exam: There will not be a final exam.

Tentative Weekly Course Schedule

Note this schedule assumes Friday meetings from Noon to 1:00 in Spring 2022. Assigned readings will be posted throughout the course.

Date	Day	Lec	Topic	Due dates
28-Jan	Fri	1	What is team science and why now	
4-Feb	Fri	2	Benefits and pitfalls	
11-Feb	Fri	3	Types, organization, and structures of teams	
18-Feb	Fri	4	Personalities and roles on the team	
25-Feb	Fri	5	Conflict of interests	
4-Mar	Fri	6	Credit, sharing, open science	
11-Mar	Fri	7	Creative process as a team	
18-Mar	Fri	8	Trust – philosophy	Paper (3 pages)
25-Mar			SPRING BREAK	
1-Apr	Fri	9	Gaining and keeping Trust - practical	
8-Apr	Fri	10	Communication within the team	
15-Apr	Fri	11	Interactions with non-team audiences (e.g. sponsor, stakeholders)	
22-Apr	Fri	12	Healthy conflict, difficult people, and its management	
29-Apr	Fri	13	Measuring performance of teams	
6-May	Fri	14	Organizing teams and team (ending) legacy issues	Term paper

Required textbooks, reading and/or software or computer needs

Readings will be assigned throughout the course associated with each lecture.

The readings will be a mix of excerpts from the following documents. Small portions of some of the documents below are used (not the entire book), and lectures will weave the excerpts together.

Aarons G.A., K. Reeder, C.J. Miller, and N.A. Stadnick. 2019. Identifying strategies to promote team science in dissemination and implementation research. *Journal of Clinical and Translational Science*, page 1 of 8.
 Baker, B. 2015. The science of team science. *BioScience* 65: 639-644.

- Bennett, L.M., H. Gadin, and C. Marchand. 2018. *Collaboration and Team Science: A Field Guide*, 2nd Edition. National Institutes of Health.
- Bennett, E.M. 2017. Research frontiers in ecosystem service science. *Ecosystems* 20: 31-37.
- Cheruvilil, K.S., P.A. Soranno, K.C. Weathers, P.C. Hanson, S.J. Goring, C.T. Filstrup, and E.K. Read. 2014. Creating and maintaining high-performing collaborative research teams: the importance of diversity and interpersonal skills. *Frontiers in Ecology and the Environment* 12: 31-38.
- Elliott, K.C. 2008. Scientific judgment and the limits of conflict-of-interest policies. *Accountability in Research* 15: 1-29.
- Groß, M., and M. Stauffacher M. 2014. Transdisciplinary environmental science: problem-oriented projects and strategic research programs. *Interdisciplinary Science Reviews* 34: 299-306.
- Hall, K.L., A.L. Vogel, and R.T. 2019. *Strategies for Team Science Success*. Springer Nature.
- Jones, N. 2007. A code of ethics for the life sciences. *Science and Engineering Ethics* 13: 25-43.
- Lencioni, P. 2005. *Overcoming the Five Dysfunctions of a team*. Jossey-Bass, Wiley.
- Levin, P.S., and M.R. Poe. 2017. *Conservation for the Anthropocene Ocean: interdisciplinary science in support of nature and people*. Academic Press.
- National Research Council. 2015. *Enhancing the Effectiveness of Team Science*. The National Academies Press.
- Nelson, M.P., and J.A. Vucetich. 2009. On advocacy by environmental scientists: what, whether, why, and how. *Conservation Biology* 23: 1090-1101.
- Quick Guide to the 16 personality types in organizations. Telos Publications.
- Resources for Research Ethics Education. <http://research-ethics.org/>
- Rose, K.A., M.C. Fabrizio, and B.A. Phelan. 2012. Determining authorship: why is something that seems so simple often so difficult? Pages 7-18, In: *Science Communication for Natural Resource professionals*. American Fisheries Society.
- Shaman, J., S. Solomon, R.R. Colwell, and C.B. Field. 2013. Fostering advances in interdisciplinary climate science. *Proceedings of the National Academy of Sciences* 110: 3653-3656.
- Thriving in an Era of Team Science. Burroughs Wellcome Fund, Research Triangle Park, NC.
- Team Science Toolkit. <https://www.teamsciencetoolkit.cancer.gov/Public/WhatIsTS.aspx>
- Wolff, J. 2018. *An Introduction to Moral Philosophy*. W.W. Norton.

Course Communication and Resources

Moodle (<http://moodle.cbl.umces.edu>) will be used extensively this semester. All course materials will be administered through the website. Handouts with slides will be posted at least 2-3 days before each day's class; students should have these available during class.

The instructor will be available by e-mail, phone, and in-person during normal working hours; specific office hours will be posted and the instructor will be accessible in person or via zoom for students during office hours.

Campus Policies

The University of Maryland Center for Environmental Science has drafted and approved of various academic and research-related policies by which all students and faculty must abide.

Please visit <http://www.umces.edu/consolidated-usm-and-umces-policies-and-procedures> for a full list of campus-wide academic policies.

Course-Specific Policies and Expectations

NA