

NSF Research Traineeship Guidelines for Students for Interdisciplinary Chapter and Transdisciplinary reports

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Outcome of collaborative work

Each student engaged in the OSU-NRT program will work on a NRT Team Project. The NRT Team Project is a collaborative effort to address a topic / question that all members of the team collectively define and determine. The NRT Team Project must contain elements of the NRT Core Concepts: big data, risk and/or uncertainty quantification, and coupled natural-human marine system science.

There are **two products** resulting from the students' collaborative work on the NRT Team Project (Table 1).

Product 1:

Each student will complete an *interdisciplinary chapter* for their MS thesis or PhD dissertation, based on their NRT Team Project. The distinguishing element of the interdisciplinary chapter is that of being **based on a topic or research question that has been collectively defined by your group before addressing it** (see the 'Project' form for strategies to help you formulate a common research topic or question). This topic or questions must include elements of data (which are big), risk and/or uncertainty quantification, and coupled natural-human marine system science. **However, each individual interdisciplinary chapter does not need to contain all three of these elements.** It is up to the student to decide which of these three elements is covered in the interdisciplinary chapter.

The formatting of the interdisciplinary chapter should reflect that of a typical thesis chapter: introduction / background, method, results and discussion, and conclusion. NRT Team members ***may share similar (even identical) introduction / background, and conclusions in their interdisciplinary chapters.*** It will be ***the methods, results and discussion -- based on their disciplinary expertise and research challenges -- that will be unique.*** Note that these chapters may refer readers to (aka cite) the other Team member's chapters. If the chapter is published, each student should consider including other student team members and/or advisors as co-authors, depending on their level of engagement in developing the question and carrying out the study to a peer-reviewed level of quality (Table 1). We ask that you clearly identify the ID chapter within the thesis, with a sentence: *'This chapter was completed in partial fulfillment of the OSU-NRT program in Risk and Uncertainty quantification in marine science and policy.'*

Examples of completed ID chapter from previous NRT students are available through the OSU Scholar Archives portal. Please inquire with us if you want to see past ID chapters.

Product 2:

The students in each NRT Team must also **collaboratively complete a transdisciplinary report.** This might be a figurative mixture of their interdisciplinary chapters, and as such it should involve no or minimal use of additional data. However, **in the transdisciplinary**

report, the disciplinary expertise of each student is no longer “traceable” as it’s written in “one voice.” In other words, all contributions are merged to address the NRT Team Project’s topic / research question and the collaborative effort. While publication might be a desired outcome, publication is NOT a requirement. However, we recommend depositing the report in a publically accessible repository, such as OSU Scholars Archives.

The transdisciplinary report can take multiple forms, depending on how you intend to merge your disciplinary perspectives and experience working together. Some examples might be:

1. An integrated literary *synthesis* addressing common research goal(s) from multiple disciplinary perspectives. Example: a review of large pelagic management practices around the world, and identification of knowledge gaps from human and biological perspectives.
2. A *mathematical* or *statistical model* that includes qualitative or quantitative insight from all team members. Example: a bioeconomic model of fleet and resource dynamics that includes environmental- and human-driven uncertainties
3. A *policy analyses* that includes knowledge (qualitative and quantitative) from all team members. Example: a management strategy evaluation, such as an assessment of marine spatial planning policies under human and biophysical constraints.
4. A *visualization tool* that captures the skills of all team members. Example: the display of uncertainties in model forecast.
5. A *conceptual model* to quantify and implement a new management strategy. Example: a strategy to examine the placement, typology, and size of marine reserves in a well-defined geographic region.
6. A *vulnerability assessment* of a system. Example: an assessment of the exposure, sensitivity, and adaptive capacity of XX groups to phenomenon YY

While the content and form of the transdisciplinary report may vary from team to team, we ask that all reports include 1. clear description of each student’s contribution and 2. a team description and reflection of the TD process (e.g., frequency of meetings, delegation vs team work, challenges and opportunities encountered during the process of developing TD research, etc.). We also ask that *the transdisciplinary report does not exceed 40 pages including title, main text, individual contributions and team reflections, refs, figures, and tables. Additional text, figures, tables (e.g., detailed methodologies), can be included as an Appendix. Any deviations from these guidelines should be requested and justified at least one month in advance of the report submission.*

When and how to write the interdisciplinary chapters and transdisciplinary reports

The first step is that of collectively identifying the NRT Team Project: the **topic or research question that will be collectively addressed by your Team**. Defining a question before addressing it sounds the obvious thing to do, but when it comes to implementation of inter- or transdisciplinary research, this seemingly logical course of action is not always followed (for example, agencies technical reports). Ideally, you will do that by the end of Fall term in your first NRT year.

Once this has been accomplished, Team members should start working on the outline of their interdisciplinary chapters and transdisciplinary report. An outline is a

roadmap for the completion of the chapter and report. It is 2-3 pages long, containing NRT Project Topic/research question, background and rationale/justification, approach/methods, anticipated results, and significance. Outline should be completed by the end of Winter term in your first NRT year. Recall that the introduction section of an interdisciplinary chapter is a product of your collaborative thinking, and is shared among Team members. So preparing an outline for your chapters also requires a collaborative effort. For the rest of the NRT year (spring and summer), students complete their interdisciplinary chapters, and the transdisciplinary report.

Table 1: Guidelines for Interdisciplinary chapters and transdisciplinary reports

	Interdisciplinary chapter	Transdisciplinary report
Who are authors?	Individual student	All students in an NRT team
Where does it appear?	In the thesis	As a separate document from thesis
How related to each other?	Information in the chapter is each student's contribution to the transdisciplinary report	Transdisciplinary report is based on the research conducted in the chapters. Has similar introduction of the chapters, but the methods, results and discussions are new, and directly address ALL aspects of the NRT Team Project goals
What is the topic?	<ul style="list-style-type: none"> • One aspect of the NRT Team Project that best relates to the student's individual research topic • May involve new data collection if it was part of the student's individual research topic, but new data is not required specifically around the Team topic • Contains <i>at least</i> one of the NRT Core Concepts: big data, risk and/or uncertainty quantification, and coupled natural-human marine system science. 	<ul style="list-style-type: none"> • Topic of the NRT Team's Project • Minimal or no acquisition of new data in the form of interviews, experiments, or field collections • Contains all three of the NRT Core Concepts: big data, risk and/or uncertainty quantification, and coupled natural-human marine system science.
What is the format?	<ul style="list-style-type: none"> • A typical thesis chapter: introduction / background, method, results and discussion, and conclusion • NRT Team members may share similar (even identical) introduction / background, and conclusions • Must be clearly identified within the student thesis with a sentence: <i>'This chapter was competed in partial fulfillment of</i> 	Several options: <ol style="list-style-type: none"> 1. An integrated literary <i>synthesis</i> 2. a <i>mathematical or statistical model</i> 3. a <i>policy analysis</i> 4. a <i>visualization tool</i> 5. a <i>conceptual model</i> 6. a <i>vulnerability assessment</i>

	<p><i>the OSU-NRT program in Risk and Uncertainty quantification in marine science and policy.'</i></p>	<ul style="list-style-type: none"> • Has a clear description of each student's contribution to the report • Has a team reflection of the TD process (e.g., frequency of meetings, delegation vs team work, etc.) • No more than 40 pages
When is it written?	<ul style="list-style-type: none"> • By the end of Fall term of NRT year: define NRT Team Project topic / question • By the end of Winter term of NRT year: complete outline • By the end of spring and summer of NRT year: complete the main text (introduction, methods, results, discussion) • Complete chapter by the time the thesis is delivered to graduate school 	<ul style="list-style-type: none"> • By the end of summer term during your NRT fellowship year. For this year the due date for this is Aug. 30th. One or more of your team will be asked to present your Project and this report at the IFC field course for the incoming NRT cohort.
Who reads it and provide comments	<ul style="list-style-type: none"> • Student's major professor and thesis committee 	<ul style="list-style-type: none"> • NRT Cluster for that Team project (continuously) • NRT curriculum committee (after delivery), see assessment rubric • Two external referees, see assessment rubric
What are the publication goals?	<ul style="list-style-type: none"> • Student and advisor may try to publish • Student is first author • Students and faculty in the cluster (including minor professor) may need to be included depending on their involvement • Acknowledge NSF-NRT support 	<ul style="list-style-type: none"> • Student team may try to publish • Order of authorship is agreed upon based on contributions to the report • Faculty in the cluster may need to be included depending on their involvement • Acknowledge NSF-NRT support • Need to address reviewers feedback prior to sharing and publishing report