

Dear Parents,

My name is Dr. Lucio Mare. I will be your child's instructor in Methodology of Science–Biology at Stanford Online High School for the 2023–24 school year. If this is your first year at Stanford OHS, welcome! And if you are OHS veterans, welcome back!

It's a great privilege and responsibility to be your child's instructor, so I wanted to give you an overview of who I am and what we'll be doing this year in MSB (which is what all the cool kids call our course).

Background

Since 2018, I live with my partner in Kensington/Berkeley, CA. As a professor, I have vast in person and online experience designing active-learning focused introductory courses in the history of philosophy and science, ethics, and critical thinking, as well as upper-level courses in biomedical ethics, logic, and modern social and political philosophy. My passion for teaching is shaped by a 12-year cross-cultural educational experience as a BA, MA, and PhD international student across four different university systems, in Romania, France, Italy, and the US. As a result of this extensive experience, I am fluent in 5 languages and staunchly committed to constantly tailoring my pedagogical approach and learning about innovative active learning strategies to better address student needs and particularities.

Between 2009-2011, I received two M.A. degrees in philosophy, one at the Université Paris-Sorbonne, Paris IV, France, and another one at the Scuola Normale Superiore, Pisa, Italy. In 2016, I obtained my Ph.D. at the University of South Florida, where I wrote my dissertation on G.W. Leibniz's views on individuation and their relation to modern atomist theories of matter. After obtaining my Ph.D., I taught at USF Tampa for a couple of years, then joined University of San Francisco in 2019, and now OHS full time since May 2022 (after teaching MSB part-time since 2020). I am excited at the opportunity of being able to ensure that my OHS students get to college already mastering the skills necessary to do valuable scientific and scholarly research. I am confident that acquiring these academic skills while already in high school will set my students on a path towards becoming effective independent researchers, and strong critical-reflective thinkers. My main responsibility as a teacher is to make my students' experience in our courses both highly intellectually stimulating and practically interesting and entertaining.

At OHS, our Core curriculum consists of four courses taught by philosophers. (This makes us philosophers feel super important, which is good for our mental health.) Those courses are as follows:

- 9th grade: Methodology of Science–Biology (“MSB”)
- 10th grade: History and Philosophy of Science (“HSC”)
- 11th grade: Democracy, Freedom, and the Rule of Law (“DFRL”)
- 12th grade: Critical Reading and Argumentation (“CRA”)

In this sequence, students develop their critical thinking skills by starting with the specific and practical, then working up to the general and abstract. And it all begins in MSB, which introduces students to scientific reasoning using biology — and the statistical methods employed therein — as our case study.

The Structure of MSB

MSB has the following structure:

1. Fall Semester
 - a. Ecosystem Ecology
 - i. E.g., nutrient cycles and biomes
 - b. Community Ecology
 - i. E.g., the interactions between species within biomes
 - c. Population Ecology
 - i. E.g., the interactions between individuals in a species
2. Spring Semester
 - a. Organismal/Behavioral Ecology
 - i. Types and development of behaviors
 - ii. Types of learning
 - b. Genetics
 - i. Genes and Genomes (Mendel and Darwin)
 - ii. DNA
 1. DNA structure
 2. DNA replication
 3. DNA mutations
 - 4.

So, while the Core sequence as a whole moves from the specific to the general, MSB works in the other direction. We begin at the level of the planet and its biomes, then zoom in to examine the species within biomes, the individuals within species, and the genes within individuals.

Along the way, we introduce students to the statistical concepts and techniques that help us reason scientifically and critically about those biological topics. More specifically, we see how those statistical concepts and techniques can help us engage in “scientific inference to the best explanation,” and critically evaluating information. We’ll start with basic concepts like “means, medians, and modes,” with which your child may already be very familiar. By the end of the year, however, you can expect your child to be using terms like “correlation coefficient” and “type 2 error,” and to subtly accuse you of committing a “Simpson’s paradox” type of fallacious inference chain.

Based on past experience, I would predict that some students will find the biology side of our material entrancing, but the statistics more challenging. Others will find the statistics to be a breeze, but find the biology boring. Still others will find both the biology and the statistics to be annoying but will love the philosophical discussions we have about the material and the closely related argument analyses of statistical evidence for real-world claims. I think, in other words, that MSB has “something for everyone.” However, if you find that your child is particularly struggling with any part of the course, please encourage them to:

- a) come to my regularly-scheduled office hours, and/or
- b) send me an e-mail to schedule a one-on-one “floating” office hour, and/or
- c) make an appointment with one of the MSB dedicated peer tutors at OHS’s Writing and Tutoring Center.

Students can find more information about all three of those options on Canvas: scrolling down to ["Instructor Information"](#) . Additionally, all of the information about the course detailed below can be found on Canvas under [Course Basics](#) and [Course Policies](#) . Repetitive? I know! But repetition is the mother of learning.

Assignments

All assignments for the course will also be listed on Canvas. Those assignments fall into five categories:

- pre-class short readings or video lectures to complete (class discussion will build on them)
- class discussion - participation (4 monthly grades, 20%)
- 16 short, weekly review quizzes (20%, lowest score dropped)
- 4 writing assignments (30%)
- 2 exams each semester (one midterm and one final: each 15%)
- final project (Spring term only – 10%)

Pre-class Tasks (readings, video lectures)

In general, students should watch the relevant lecture or lectures (as outlined on the course schedule) before each discussion section, as discussion will often build on the material contained in the lecture(s). Reading assignments, unless otherwise noted, are recommended but not required. Any additional preparation that is required will be spelled out on the course webpage on Canvas.

In MSB, we use the “flipped classroom” model, where new information is sometimes (but not always) delivered in lecture videos outside of class, while class time is devoted to discussions and exercises that help students deepen and solidify their comprehension.

I should also note two things about classroom discussion:

- While we are not watching lecture videos before each class meeting,
- students should take notes on (they should create outlines of the information in) classroom discussions, even though most of those discussions will be recorded for exam reviewing purposes. Note-taking facilitates learning comprehension and saves time in terms of recapturing information that has already been covered.

Participation

Students will receive a class participation grade each month. The minimum requirements for receiving a passing participation grade in my sections is that students be (1) in class and (2) on camera for the full class period. I make exceptions to the second of those requirements, however, in cases where students have severe anxiety related to being on camera. Students also often request permission to “stay off cam” if they are sick, or while they are eating. I don’t personally understand why being on camera while having a cold or eating cereal would be embarrassing, but I also don’t think I should tell people how to feel. So, I generally grant such requests. To get higher than a passing participation grade, students also need to make contributions to class discussion. I grade such contributions in terms of both quantity and quality. Every comment or question, whether made in chat or on mic, earns a student participation credit (unless that contribution was distracting or disruptive). **A contribution made on mic will automatically receive more points in my grade**

calculations than the same contribution made in chat, however. I do this because I want to encourage us to actually talk with each other. Furthermore, given the “seminar” format of our class discussions, mutual collaboration and engaged participation are central to our success in this course.

Finally, I give a “particularly helpful or insightful” contribution the most points, *regardless* of whether it was made on mic or in chat. While I cannot provide a formula or recipe for students to follow, I can say this: I appreciate it when students make comments or ask questions that help their fellow students understand the material better. One way of doing this, often, is for students to ask questions because they are confused. This requires courage *and* it helps others who are also confused! Also, I appreciate it when students respond to other students’ contributions in ways that develop and deepen the discussion. This, again, can be done both through making comments *and* asking questions.

Short Review Quizzes

The weekly quizzes are taken on Canvas and posted at irregular intervals. These quizzes are learning tools and they are:

- (1) unproctored
- (2) open book
- (3) open notes and
- (4) open internet

However, they are *not* “open people” (that is, students are not allowed to discuss the quiz questions with others), nor open GenerativeAI!

There is one exception to the “not open people” policy, however. Students are welcome to discuss quiz questions with me, or with the official MSB peer tutors (consultation with whom is available through the OHS Writing Center). We won’t be able to directly answer the questions for them, of course, but we can help them clarify and process the concepts they need in order to approach those questions.

Furthermore, as mentioned before, the quizzes are:

- (5) untimed and
- (6) the lowest grade is dropped at the end of the semester

The function of the quizzes, therefore, is not to put students under time pressure or force them to memorize lists of facts. Rather, it is to help them gauge their progress in understanding the material.

Exams

Finally, there will be both a midterm exam — roughly halfway through the semester — and a final exam. These exams will be taken outside of class. They will be unproctored, open book, open

notes, and open internet, but not “open people,” or open GenAI — just like the weekly quizzes. However, they will be timed, and can only be taken once. Furthermore, they are much longer than the weekly quizzes — students will have roughly three hours in which to complete a given exam. Before each exam, there will be review lecture videos for students to watch (one for the biology content and one for the statistics content), and two days of in-class review.

Project

In the Spring semester, you will complete an independent scientific research project. The final project consists in applying the sum of our critical-argumentative skills and our knowledge of what scientific experimentation involves statistically speaking to particular cases in biology/ecology/population dynamics etc. At the end of a long and productive year together, this will be your opportunity as students to show off all of your amazing new talents! More information and resources about this project will be provided to students towards the end of the Fall semester.

Workload

The only expected class prep for students is to check out the Canvas resources in the pre-class task and complete the corresponding lecture or reading, before attending each class. Those pre-class tasks can be found on Canvas. (Participating in class discussion, completing pre-class tasks, watching any videos or reading any related class material should include taking notes, as well, which I will try to periodically remind students.) I expect that this will generally amount to a total of one or two hours per week.

Sometimes, there will also be optional readings or video lectures (Related material – post-class) listed on Canvas beside the links to pre-class tasks. However, my peers and I acknowledge that there are a limited number of hours in the day, and students should only devote those hours to MSB’s additional materials if (a) they find a topic interesting and want to go deeper or (b) they find a topic confusing — even after our in-class discussions — and want clarifications.

So, I would expect a “normal” MSB week to require a maximum of three or four hours of work outside of class. I would expect the week or two leading up to each end of the semester project to require perhaps six to eight hours per week. And finally, I would expect the week or two leading up to an exam to require the same six to eight hours *plus* an extra three hours during the exam week for actually taking the exam (since exams are taken outside of class).

Those are just estimates, however. If you find that your child is spending significantly more time on MSB than on other classes, please encourage them to email me to set up a floating office hour. MSB is an important class, but — in my considered, philosophical opinion — there are things that are even more important (e.g., playing an instrument, communal family events, mental health, creating art, hiking in nature, going to a movie theater with your loved ones, etc.).

Best,
Dr. Lucio Mare