

First-year Seminar, Fall 2018
Curiosity and The Human Experience
Karl S. Roth, M.D.
Venkat Gopalan, Ph.D.

1. Sample syllabus

Course goals

By encouraging free-ranging curiosity among course participants, the overarching goal of the course is to broaden the students' perspectives on science and society. Participants will evaluate the premise that humans are hard-wired for curiosity, and explore how this attribute has contributed to the advancement of human understanding of the universe. The classroom discussions are expected to enrich the students' college experience, both within and outside their major.

Content

We have selected a group of individuals (e.g., Embden, Leeuwenhoek, Mendel, Newton), whose curiosity and their searches for answers led to the development of key disciplines far reaching in scope and value. Students will be encouraged to use their imagination to place themselves in a state of relative ignorance, as were the individuals under consideration, and then navigate the path from the initial question to the final answer. To demonstrate the holistic nature of human endeavors, students will also be urged to consider the tools from other disciplines that were used during these journeys.

Meeting times

Fridays, 3:00 to 3:55 PM, 773 Biological Sciences Building, 484 West 12th Avenue

Weekly outline of topics

Each seminar session will involve discussion of a specific individual, taking into account various factors elaborated below (see *Listing of assignments*). Here is a tentative list of the individuals that we plan to discuss.

1. Aug 24 - Introductory session
2. Aug 31 Gutenberg: development of literacy
3. Sept 7 Newton: basis of modern physics
4. Sept 14 Leeuwenhoek: genesis of microbiology
5. Sept 21 Mendel and Franklin: genetics and structure of the genetic blueprint
5. Sept 21 Galileo: observational astronomy and a new view of the universe
6. Sept 28 Columbo: discovery of blood circulation
7. Oct 5 Priestley: discovery of Oxygen
8. **Oct 12 Fall Break (no classes)**
9. Oct 19 Embden, Leloir, Meyerhof: Carbohydrate metabolism
10. Oct 26 Piaget: Cognitive development
11. Nov 2 Becquerel and Curie: Radiation
12. Nov 9 Bohr: Quantum model of the atom
13. Nov 16 Einstein: Theory of General Relativity
14. **Nov 23 Thanksgiving break (no classes)**
15. Nov 30 Final wrap-up session

List of assignments

Students will have access via Canvas/Carmen to a reading list that includes short biographical details, synopses of the work of each person, and how a chain of

investigations led to advances in human knowledge. Students will be expected to prepare for each session by reading the assigned material and by familiarizing themselves with tools from contemporary ancillary disciplines that were used to address unanswered questions. They will also be expected to explore source material largely to explain how the curiosity of the individual under consideration led to subsequent discoveries. We will place on reserve in the BPL library books that are pertinent to the mainstay (e.g., *Microbe Hunters* by Paul de Kruif), and guide students to important resources such as the Nobel archives (www.nobelprize.org).

Required textbooks or reading assignments

While no textbooks are required, students will have to read articles posted on the course website [e.g., Whitesides (2018) Curiosity and science. *Angew. Chem. Int. Ed.* **57**: 2-6].

Grading

Students will be graded S/U, based on their participation in active discussion, as well as their evident initiative in reading assigned and other source materials (i.e. their curiosity). No more than two excuses will be allowed barring medical exigencies. Students will be assessed as follows: attendance (25%), classroom participation (25%), and end-of-semester essay (50%). Students will submit a two-page essay (Helvetica font size 11, one-inch margins, and 1.5 line spacing) that focuses on any subject of their choice and highlight how that person's curiosity led to a major discovery. A cumulative score above 75% will be scored as Satisfactory (S).

Instructors

Primary (Lead): Karl S. Roth, Visiting Scientist, Department of Chemistry & Biochemistry (703 BioSci, 484 W 12th Ave)

Secondary: Venkat Gopalan (gopalan.5@osu.edu), Professor, Department of Chemistry & Biochemistry (774 BioSci, 484 W 12th Ave)

Note: Dr. Roth's appointment was recently approved, and will soon have an OSU email.

Academic integrity

Students are required to read OSU's Code of Student Conduct (oaa.osu.edu/coam), and submit a signed statement that they have read and understood OSU's academic misconduct policy. Key facets of this policy are reproduced here *verbatim* from oaa.osu.edu/coam.

“Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University’s Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University’s Code of Student Conduct may constitute “Academic Misconduct.”

The Ohio State University’s Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination.”

Disability services

Students are encouraged to arrange a private meeting to discuss accommodation options if he/she believes that such steps are necessary to overcome academic obstacles caused by a disability. The following statement is reproduced *verbatim* from <http://www.ods.ohio-state.edu/faculty-staff/syllabus-statement/>:

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience

academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Biographical statements

Karl S. Roth: Following completion of my residency training, I began my teaching career at University of Pennsylvania as a Fellow in Genetics and Metabolism. In this role, I was responsible for providing teaching seminars for medical students and residents. In addition, I was involved in an outreach program to local high schools in the Philadelphia area, providing lectures on the nature of genetic disorders. After moving to the Medical College of Virginia, I served as co-director of the Guaranteed Medical Admissions Program, which enlisted outstanding high school seniors heading for medical careers. In this position, I interviewed students and parents, as well as providing regular, biweekly basic lectures on various medically-related subjects to these students as they moved through their undergraduate years. In addition, I served as a co-mentor for students in this program during their four undergraduate years, and in some cases, while in medical school. I also served on the Admissions Committee of the medical school for 12 years, in the process interviewing senior undergraduates and, again, in some cases continuing as their advisor upon entering.

I am greatly interested in the history of science and of medicine, in particular; over the past 40 years, it has become clear to me that medicine is but one discipline that has benefited from multiple human endeavors, as have many others. It is this

holistic view of the results of human curiosity that I would like to convey to undergraduates, with the expectation of broadening their world-views and enriching their educational experience.

Venkat Gopalan: I have been at OSU for 20 years, and am now a Professor in the Department of Chemistry and Biochemistry. I have taught various undergraduate and graduate level courses in biology and biochemistry. My current teaching duties include Intermediary Metabolism, a core course that is mandatory for Biochemistry majors, and Methods in RNA Biology, an elective course for doctoral students in life sciences. I have always been interested in history, an attraction that has morphed more specifically into the genesis of scientific knowledge. Encompassed within this broad theme is this course that evaluates how curiosity has always been the major driver for understanding nature. I am pleased to work with the lead instructor, Dr. Karl Roth, on developing the framework for this course and participating in some of the discussions.