

Aims of Science (PHI 850; Spring 2026)

Hall of Languages 538, Thursdays 3:30-6:15pm (4:48-5:00pm break)

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Office Hours: TBD

COURSE DESCRIPTION:

What, if anything, does science aspire to do? To what extent, if at all, can we make sense of ascribing aims to science, understood as a group activity? We will begin by discussing the significance of scientific aims for the traditional realism vs. anti-realism debate about physical unobservables. Next, we will turn to normative dimensions of an activity's aims. At least one of us will advocate understanding them in terms of the minimal success conditions constitutive of an activity. With these preliminaries before us, we will consider a variety of anti-realist and realist proposals for the aims of science (undergirding concomitant criteria for *scientific progress*). We will proceed roughly in order of logical strength, moving from the least committal to most committal proposals. At least one of us will advocate empirical adequacy as a constitutive aim of science. The course will be most fun if a few participants pick up the mantle of passionately arguing against this thesis as it arises. Frequently, we will consider how debates in philosophy of science hinge on the nature of central epistemic concepts like belief, truth, rationality, knowledge, and understanding.

COURSE ACTIVITIES:

1. *Participation* (11%): Each week by **Thursday 11am**, please email me (i) a thesis or position that you plan to endorse/defend/propose/or advocate for (perhaps merely as a devil's advocate) and (ii) a reason for that thesis. I will then add this to a handout for the day, with your name beside.
 - a. You'll be expected to briefly defend or discuss your thesis at some point during class.
 - b. Assuming we have enough people in regular attendance, you can miss two classes without penalty (but please email me by Thursday 11am to give me a heads-up!).
2. *Presentations* (32%): twice during the semester, provide a 15-20 minute overview of an argument(s) in a reading, based on a max 2-page handout (one sheet of paper), followed by moderating a 15-20 minute discussion.
3. *Paper(s)* (57%), choose one of the two tracks described below:
 - a. *Track Two*: complete two 3000 to 4000-word argumentative papers, due **March 15th** (25%) and **May 1st** (32%), respectively. Each paper should briefly motivate, articulate, and defend a philosophical intervention connected to a class topic. No need to engage with more than two sources. I am looking for a structurally sound argument.
 - b. *Track One*: complete a 6000 to 8000-word term paper due **May 1st** (47% of grade). Please cite at least six sources, engaging non-trivially with at least four. You may propose to write on a topic of personal interest, connected to at least one unit from the course.

- i. A 1500-word blurb of the core argument or idea for your term paper will be due by **March 15th** (10% of grade). This can be fairly rough (e.g. in the form of bullet-point sentences or an outline).

Since final grades are due May 11, the maximum extension on a paper will be to May 7th (unless you are planning on an incomplete, in which case please be in touch about this by April 2nd).

Each week, I will announce on Blackboard more fine-grained directions for which parts of various sources to read (sometimes small excerpts from much longer works). Total reading each week will hopefully come in under 35 pages, with 100% optional supplements (no obligation necessary).

Textbooks: we will read a few chapters from [Alex Bird's \(2022\) *Knowing Science*](#), with access provided by Syracuse Libraries.

Likewise for Yafeng Shan's (2022) edited collection [New Philosophical Perspectives on Scientific Progress](#)

SCHEDULE OF TOPICS AND READINGS:

Week 1 (1/15) (on zoom!)	Intro and Overview <i>Note:</i> Josh will be in SoCal this week, so we'll meet on zoom (if possible!) Optional: Niiniluoto's (2024) SEP on Scientific Progress Everyone is <i>excused</i> from sending in a discussion question this week
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Unit 1: Aims and Normativity

Week 2 (1/22)	History and (anti-)Motivation Excerpts from van Fraassen 1980, <i>The Scientific Image</i> : Sections 2.1-2.2, 3.1, 4.1 Rowbottom 2014, "Aimless Science" Supplements: Rosen 1994, "What is Constructive Empiricism?" van Fraassen 1994, "Gideon Rosen on Constructive Empiricism"
Week 3 (1/29)	Aims of Science Potochnik 2015, "The Diverse Aims of Science" Bird (2022), Ch. 2 "The Aim of Science" Supplements: Lawler 2025, "Does Scientific Progress need Aims?"
Week 4 (2/5)	Aims of Inquiry (Epistemic Normativity) Wedgwood 2002, "The Aim of Belief" Zalabardo 2010, "Why Believe the Truth? Shah and Velleman on the aim of belief" Supplements: Hookway 2007, "Fallibilism and the Aim of Inquiry" Berker 2013, "Epistemic Teleology and the Separateness of Propositions"
Week 5 (2/12)	Constitutive Aims Silverstein 2016, "Teleology and Normativity" Chrisman 2022, Ch. 5 "The Aim of Belief and the Goal of Truth"

	<p>Supplements: Buckareff 2023, “The Constitutive Aim of Inquiry” Silverstein 2025, “The Aim of Practical Reasoning”</p> <p style="text-align: center;">Unit 2: Candidate Anti-realist or Irrealist Aims</p>
<p>Week 6 (2/19)</p>	<p style="text-align: center;">(Non-factive) Problem-Solving</p> <p>Laudan 1996 Ch. 4 “A Problem-Solving Approach to Scientific Progress” in <i>Beyond Positivism and Relativism</i> Shan 2022 Ch. 3, “Scientific Progress as Increased Usefulness”, Sections 1 and 2</p> <p>Supplements: excerpts from Kuhn 1962, <i>The Structure of Scientific Revolutions</i> Laudan 1977 Ch. 1 “The Role of Empirical Problems” in <i>Progress and its Problems: Towards a Theory of Scientific Growth</i> Goldman 1986 Ch. 6, “Problem Solving, Power, and Speed” in <i>Epistemology and Cognition</i></p>
<p>Week 7 (2/26)</p>	<p style="text-align: center;">Predictive Power, Control, Usefulness</p> <p>Douglas 2014 “Pure Science and the Problem of Progress”, especially Section 3 Shan 2022 Ch. 3, “Scientific Progress as Increased Usefulness”, Section 3 to end</p> <p>Supplements: Shan 2019, “A New Functional Approach to Scientific Progress” Relevant passages from Hempel 1965 <i>Aspects of Scientific Explanation</i></p>
<p>Week 8 (3/5)</p> <p>Next week is spring break!</p>	<p style="text-align: center;">Empiricism & Empirical Adequacy</p> <p>Bird (2022), Ch. 6 “Observation” Bueno 2017 “Empiricism”, in <i>Routledge Handbook on Scientific Realism</i></p> <p>Supplements: Bhakthavatsalam & Cartwright 2017, “What’s so special about empirical adequacy?” Ruyant 2021 Ch. 4 “Modal Empirical Adequacy” Percival 2007, “An Empiricist Critique of Constructive Empiricism: The Aim of Science”</p>

Unit 3: Candidate Realist Aims

<p>Week 9 (3/19)</p>	<p style="text-align: center;">Truth (about all levels of reality)</p> <p>Niiniluoto 2022 “The Semantic Approach: Scientific Progress as Increased Truthlikeness” (ch. 2 in Shan collection), mainly section 3 to end Excerpts from Elgin (2017) <i>True Enough</i></p> <p>Supplements: Schurz 2017, “Truthlikeness and Approximate Truth” in <i>Routledge Handbook of Scientific Realism</i> Excerpts from Chirimutta 2024 <i>The Brain Abstracted</i> Morrison 2015 Ch. 4, “Mediated Knowledge: Representation and the Theory-Model Axis” Harker 2022, “Scientific Progress and Scientific Realism”, Ch. 14 in Shan (ed)</p>
<p>Week 10 (3/26)</p>	<p style="text-align: center;">Knowledge</p> <p>Bird (2022), Ch. 3 “Scientific Progress”</p>

	<p>Supplements: Bird 2007, “What is scientific progress?” Chang 2022, Ch. 5 “Realism” in <i>Realism for Realistic People: A New Pragmatist Philosophy of Science</i></p>
<p>Week 11 (4/2)</p>	<p style="text-align: center;">Understanding (noetic account)</p> <p>Potochnik (2017) Ch. 4 “Science Isn’t after the Truth” in <i>Idealization and the Aims of Science</i> Dellsén 2022 “Noetic Approach: Scientific Progress as Enabling Understanding”, Ch. 4 in Shan collection</p> <p>Supplements: Khalifa 2017 Ch. 1, “The Philosophy of Understanding” in <i>Understanding, Explanation, and Scientific Knowledge</i> Kelp 2021, “Inquiry, Knowledge, and Understanding”</p>
<p>Week 12 (4/9)</p>	<p style="text-align: center;">Naturalness/Fundamentality/Laws</p> <p>Wilhelm 2025, “The Value of Naturalness” Loewer 2007, “Laws and Natural Properties”</p> <p>Supplements: Loewer 2020, “The-Package-Deal-Account” Cooper 1964, “The Aims of Science”</p>

Unit 4: Rationality in Science

<p>Week 13 (4/16)</p>	<p style="text-align: center;">Is Science a Rational Activity?</p> <p>Excerpts from Strevens 2020 Ch. 4 “The Iron Rule of Explanation”, Ch. 9 “Science’s Strategic Irrationality” (p. 201ff) and Ch. 14 “Care and Maintenance of the Knowledge Machine” (p. 283ff) in <i>The Knowledge Machine: How Irrationality Created Modern Science</i></p> <p>Supplements: excerpts from Cartwright et al 2022 <i>The Tangle of Science: Reliability Beyond Method, Rigour, and Objectivity</i></p>
<p>Week 14 (4/23)</p>	<p style="text-align: center;">Meta-philosophy about rationality and the aims of science</p> <p>Excerpts from van Fraassen 2002, Lecture 2 “What Is Empiricism and What Could It Be?” (section 3 to end) in <i>The Empirical Stance</i></p> <p>Chakravartty 2017, Ch. 7 “The nature and provenance of epistemic stances”, in <i>Scientific Ontology: Integrating Naturalized Metaphysics and Voluntarist Epistemology</i></p> <p>Supplements: Chakravartty 2017, “Realism, Antirealism, Epistemic Stances, and Voluntarism”, in <i>The Routledge Handbook of Scientific Realism</i> Niiniluoto’s (2024) SEP on Scientific Progress, Section 2.5</p>

Each class, we will take a 12-minute break from 4:48pm to 5pm

Supplements and other Topics of Potential Interest:

Readings:	<ul style="list-style-type: none"> ● Peirce 1902, “What is Science?” from the <i>Minute Logic</i> ● Duhem 1954 [1906], <i>The Aim and Structure of Physical Theory</i> ● Poincare 1908, <i>Science and Method</i> ● Popper 1959 [1934], <i>The Logic of Scientific Discovery</i> ● Toulmin 1961, Ch. 2 “Forecasting and Understanding” in <i>Foresight and Understanding: An Enquiry into the Aims of Science</i> ● Levi 1967, <i>Gambling With Truth: An Essay on Induction and the Aims of Science</i> ● Excerpts from Cartwright 1983 <i>How the Laws of Physics Lie</i> ● Resnik 1993, “Do Scientific Aims Justify Methodological Rules?” ● Laudan 1996 [1987] Ch. 7, “Progress or Rationality? The Prospects for Normative Naturalism”; see also Ch. 9 replies to critics (including a section on “Aim-less Epistemology?”) ● Kitcher 2001, <i>Science, Truth, and Democracy</i> ● De Regt 2017, <i>Understanding Scientific Understanding</i>, excerpts on different levels of scientific activity ● Khalifa 2017 Ch. 8, “The Value of Understanding” in <i>Understanding, Explanation, and Scientific Knowledge</i> ● Potochnik 2017 Ch. 3 “The Diversity of Scientific Projects” and Ch. 7 “Scientific Pluralism and Its Limits” ● Maxwell 2017, <i>Understanding Scientific Progress: Aim-Oriented Empiricism</i> ● Ivanova 2022, “Scientific Progress and Aesthetic Values” Ch. 16 in Shan collection ● Massimi 2022, “A Human Rights Approach to Scientific Progress”, Ch. 20 in Shan collection ● Rowbottom 2023, <i>Scientific Progress</i> (highly critical of “aims” talk!)
Topics:	<ul style="list-style-type: none"> ● Demarcation problem: can we use (constitutive) aims to distinguish science from both non-science and pseudoscience? ● Structural realism: does science aim at knowledge of structure? ● Aim(s) of Explanation(s)? ● (End-relational) theories of value

DIVERSITY, DISABILITY, AND INCLUSIVITY:

In all course-related activities and communications, you will be treated with respect. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, military backgrounds (excluding war crimes), national origins, religious affiliations, sexual orientations, ability, and other visible and non-visible differences. All members of this class are expected to help create a welcoming and inclusive environment for every other member of the class who respects this policy.

If you are a student with learning needs that require special accommodation, contact The Center for Disability Resources (CDR) at disabilityresources@syr.edu as soon as possible, to make an appointment to discuss your needs and to obtain an accommodations letter. Please e-mail me as soon as possible to set up a time to discuss your learning needs. As someone who has used these services in the past, you can assume that I will be HIGHLY sympathetic! A [link to CDR resources](#).

Additional words of care from on high: “Syracuse University values access and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be necessary to ensure equitable access, and to collaborate with the Center for Disability Resources (CDR) in this process. If you would like to discuss disability-related accommodations or register with CDR, please visit Center for Disability Resources. Please call (315) 443-4498 or email CDRspecialist@syr.edu for more detailed information. CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations are generally not provided retroactively, please contact CDR as soon as possible to initiate this process.”

STATEMENT ON THE USE OF (GENERATIVE) ARTIFICIAL INTELLIGENCE

“Based on the specific learning outcomes and assignments in this course, artificial intelligence is permitted” for brainstorming and outlining presentations and papers (brainstorming/outlining only!) Tools that help with English grammar checking (e.g. Grammarly) are permitted in all course activities. “See each assignment for more information about what artificial intelligence tools are permitted and to what extent, as well as citation requirements. If no instructions are provided for a specific assignment, then no use of any artificial intelligence tool is permitted. Any AI use beyond that which is detailed in course assignments is explicitly prohibited except when documented permission is granted.”

LINKS TO ADDITIONAL SYRACUSE UNIVERSITY POLICIES:

- [Code of Student Conduct](#)
- [Academic Integrity Documents and Report Process](#)
- [Religious Observances Notification Policy and also here](#)