



PAUL OSTROVERHY

Paul OstroVerhy

**Easter Holiday
Academic Internship Report
2023**

BIOETHICS & ELECTRONICS

**PAUL OSTROVERHY'S TUTORED INTERNSHIP
IN BIOETHIC AND ELECTRONICS**



05/04/2023 - 16/04/2023

OBJECTIVES

A. Goals

This internship has four primary goals:

1. To introduce Paul to electronics, particularly the concepts of voltage, current, and resistance. We will perform basic circuit analysis, and learn how to read schematic diagrams.
2. To build Paul's scientific toolkit. We will cover experiment design, variables, data collection, and data visualization in the context of electronics and ethics.
3. To use Paul's background in philosophy to explore biology. We will apply philosophical frameworks to real-life medical cases and culminate by learning about principlism and the Georgetown Mantra -- the current standard used in bioethics cases.
4. To explore how these subjects (biology, electronics, and ethics) interact.

B. Deliverables

1. A final essay evaluating physician-assisted suicide using principlism.
2. A lab report on the subject of the fire alarm system.

C. Lesson plans

I propose the following structured plan for our four-hour sessions together. Suppose we begin at 9am:

9-9:20AM: Review the previous day's subjects with a creative exercise (analogy, sketch, movement). Complete circuit several practice problems.

9:20-10AM: Introduce a new concept in electronics. Examples include:

- Wires and conductivity
- Batteries and voltage
- Nodes and Kirchoff's law.

10-10:10AM: Pingpong break!

10:10-11:00AM: Solidify the new electronics concept by seeing how it is present in the fire alarm system, completing practice problems, and finding other examples in day-to-day life. Examples include:

- Learning to solder
- Color-coding nodes

11-11:10AM: Pingpong break!

11:10AM-12PM: Introduce a new philosophical framework, including counterarguments. Examples include:

- Utilitarianism
- Deontological Theory
- Principlism

12-12:10PM: Pingpong break!

12-12:45PM: Use the newly learned framework to analyze a real-life medical case.

12:45PM-1PM: Synthesize and find connections between ethics and electronics :)

LOG OF THE LESSONS

05/04/2023 - 16/04/2023

Wednesday 05 April lesson log 4h

Helen:

Summary: In our first day together, we began with an overview of the major topics we could cover together -- so that we could begin to hone in on a potential final project. We investigated the home-made fire alarm system as a stepping stone into the world of electronics. We identified each of the components, thought about the design considerations made, and reviewed the basics of electricity (voltage, current, resistance). Paul completed a sketch of the fire alarm system, and then we discussed how an aesthetic model differed from a schematic model. We reviewed schematic symbols so that we could create a schematic in the future. We reviewed the soldered connections on the board and how it worked - at which point we dug out a soldering iron and Paul gave it a try! (He made many apt marriage analogies while he soldered the two wires together). Ping pong break... and then we started talking about bioethics. We covered basic terminology (like relativism, utilitarianism, and deontological theory). We also briefly introduced some examples -- which started an interesting discussion about the brain and the homunculus!

Assignment: Analyze a bioethics case under a utilitarian framework. Provide a solution based on this framework and then provide a counterargument.

Paul:

A brainstorming was initially made to determine the overall direction that this internship should take and the freedoms and ideas that we would have, the overall idea of what this is to be. We looked at the homemade fire system first, playing around with the switch for a while, very exciting stuff, and Helen explained how it worked, the IC chip (alternatively known as chocolate chip) worked, the soldering process, safety procedures and the actual soldering itself which we actually did. Some intensive ping pong breaks, an insight into celebrity life (ie. water polo players) and an introduction to bioethics. Mind demonstrations, drawings, visual learning and some more talk revolving around what the term bio-engineering ethics means and the implications it carries, its theories and tools, and the difference between familial code and morality. Overall, a good introduction to the internship.

Thursday 06 April Lesson log 2.5H

Helen:

Summary: Today, we began to converge bioethics and electronics in pursuit of a final project combining the two. We dove deeply into the fundamentals of circuits in the first half of the lesson. Paul began to grasp voltage, current, and power (and analysed several circuits according to the physics introduced!). We developed several analogies to help with difficult concepts -- i.e. a "river" model and "Star Wars clone model" for the battery. Paul indicated that we should practice more tomorrow! After a ping pong break and a quick discussion about life at Stanford, we talked more about bioethics. We reviewed Paul's prior knowledge of utilitarianism and extensively discussed issues that arise when analysing cases with this philosophy. We practiced applying this to several medical cases (such as organ donation). As an exercise, Paul is tasked with creating a utilitarian framework and counterargument to a real brain death scenario.

Assignment: Respond to the following prompt. *A patient has been declared brain dead by physicians. Their family would not like to take them off life support for religious reasons. Argue the best course of action using a utilitarian framework and then provide a counter argument.*

Paul:

Summary: We have immersed ourselves more thoroughly into utilitarianism as part of our studies around bioethics. That was the latter part of the session, which was shorter than usual, happening in the morning from ten to noon due to a dentist appointment. The first part of the session was on the electronics theme, diving into circuits, currents, voltage, physics equations and schematics. The two sections so to speak were divided by a ping pong break in which a custom has arisen, warm up practice with the left hand. I have been gradually catching up, losing now by a close three-point margin. During the break, we talked about Stanford, its warm climate, outside lessons, incredible library, its broader programme that allows students to learn about a lot of studies that do not necessarily have to be related to each other, and the American Declaration of Independence song partially sung for education and demonstration purposes. I had a bit of trouble with Machiavelli, thinking of a fictive Macya Valley until I realised I was listening to American pronunciation.

Friday 07 April Lesson log 1.5H

Helen:

Summary: After reviewing Paul's assignment, we discussed next steps to develop it into an essay. While I helped his brother Max, he completed two assignments: additional research and an outline on the brain death ethics question posed yesterday, and a creative rendering of an item using only schematic symbols. Today, we focused mostly on electronics review since Paul indicated that was the most confusing yesterday. We drew Rube Goldberg machines to review concepts of voltage, current, and batteries. We learned about nodes, parallel and series devices, and spent the remainder of the time working through practice problems. We ended the session with a triumphant rendition of Gloria in D Major when Paul triumphed over a particularly difficult circuit analysis! We spoke briefly about Paul's outline so that he could prepare a more fleshed out version tomorrow.

Assignment: Write an essay using your outline based upon the brain death bioethics question posed yesterday. Pay particular attention to the introductory section describing brain death in layman's terms, and ensure you connect your argument back to utilitarian framework. Aim for two pages single-spaced.

If time: [CRISPR Gene Editing](#)

Paul:

Summary: The lesson started at six and not four, and in these two hours I was given assignments by my tutor, which consisted of typing up my case study response on a new document that should be shared successfully, draw something using only schematic symbols (although I did work out I could have drawn it all in lines due to the wire schematic but decided to be creative), and then I researched on 'brain death' and created a general essay outline for the case study. When Helen came, we worked on electrical engineering, using a new analogy with the Rube Goldberg machine. Nodes were learnt and problems encountered with the last ones being of particular difficulty for me personally, and when it was finally solved victory was made.

Saturday 08 April Lesson log 2H

Helen:

Summary: Paul wrote a strong essay which probed the paralyzing choices that physicians and families must make when a loved one is declared brain dead. We discussed the strengths of this essay and the room that Paul has for improvement (specifically in his scientific writing). We then discussed Kant and the categorical imperative and had a particularly interesting conversation about perfect/imperfect duties. To finish, Paul completed some additional practice problems on circuits-- and seems to finally be getting the hang of it! He will have a well-deserved day off tomorrow.

Assignment: Revise bioethics essay on brain death according to our discussion and comments. Draft a paragraph responding to the same prompt, this time from the perspective of Immanuel Kant (and the categorical imperative/deontological theory). Write a counterargument to this perspective in a separate paragraph.

Paul:

Summary: As part of my assignment, I wrote a 500-word essay (that actually went to 600 words) on bioethics and then we had a review of what was good about and areas of improvement. We then looked at Immanuel Kant, specifically the categorical imperative and his distaste for Utilitarianism, putting a seesaw of Kant, Categorical Imperative, Duty and Motive, the means justify the ends, all on one side, and on the other Machiavelli, Utilitarianism, the ends justify the means.

Monday 09 April Lesson log 2H

Helen:

Summary: Paul had revised his utilitarian essay for today, so we reviewed it in depth together. We worked particularly on topic sentences, scientific writing, and sentence structure. We took several paragraphs and analyzed them together -- first looking at the topic and evidence, and then going through line by line to make the writing clear and concise. In doing so, we reviewed the logic of each argument and ensured that it flowed. Paul will continue with this task for tomorrow.

Assignment: Finish paragraph dissection and rewrite of the utilitarian essay (I want to see the bullet points too!). Complete the Kant assignment (and incorporate what we talked about today!) Think about an experiment we can conduct together, to discuss tomorrow.

Paul:

Summary: Before the lesson started, I completed the assignment. I had to shorten my essay on bioethics to 400 words. I also had to take into account the points to improve on made by my tutor, but unfortunately an obsession was formed that was devastating to the essay. The word count became more important than the quality of the essay. I opted for taking out sentences and words within a sentence rather than reformulating the whole sentence. Time was also a factor at play. This method will fail in universities.

Tuesday 11 April Lesson log 1.5H

Helen:

Summary: Paul did warm-up electronics questions while I read his revised lessons. There was amazing improvement! His argument flowed well, and there was fewer repetition while still maintaining his good use of vocabulary. After a brief review, we discussed principlism/ the Georgetown Mantra. We used it to analyze a real-life case in which a woman with delusions of pregnancy was diagnosed with cancer. Using the 4 principles, we decided to proceed with treatment. Then, we went over the 5 main sections that make up a lab report and decided on a lab report topic!

Assignment: Write a hypothesis for both of the experiments listed above. Then, create a step-by-step guide of the experiment. Create a list of materials needed for both. Interview your father for the history of the home made fire alarm system (date, who made it, idea behind it etc.)

Paul:

Summary: Now that I wake up early and go on runs everything is in order. I started working on the assignment at ten o'clock drinking tea, completing the Utilitarian essay which Helen thought was much better, and so did I, researched on common morality, provide a Kantian and Machiavellian response to

the case study, a few questions on voltage questions where I had a dé clic with how to do them today. We learnt on principlism and common morality theory, learning on a real life example case. To finish it all off we talked about our imminent lab report and how to write one. The structure is very clear.

Wednesday 12 April Lesson log 1.5H

Helen:

Summary: Paul and I spent most of our session discussing the upcoming experiment! We talked about how to write an introduction, and Paul made his initial hypotheses. Paul initially had difficulty with the concept of hypotheses, but we worked to identify dependent variables and link them to our conclusions -- by the end he seemed to have grasped their utility. We also created a step by step methodology for our experiment. Paul certainly has his work cut out for him, but demonstrated a solid understanding of what needs to be kept consistent within the experiment. Next, we discussed the fourth principle of the Georgetown Mantra -- justice. Paul and I had an interesting discussion about 'Affirmative Action' in relation to the three main ways of dividing resources (utilitarianism, egalitarianism, and prioritarianism). As always, Paul was a wonderful debate partner.

Assignment: Draft the entire introduction -- this should be straightforward based upon the bullets we worked on today. Draft the methods -- also based upon the bullets. Draw a map of the territory and include all fire alarms. If possible, mark if the outlets they are connected to are British or French.

Paul:

Summary: I completed the interview, typed it down and am currently revising it to a form that is both acceptable and pleasing for myself and the audience. This is linked to the lab report, which was our main focus for today. We talked about hypotheses, writing them and how we will be carrying out our lab report, outlining the method, variables, equipment and general outlines. We talked on pies, using them as an analogy for the distribution of justice. We looked at three primary pies: the utilitarian, egalitarian and prioritarian, as well as a brief introduction to so-called 'affirmative action' in university applicants within the United States of America.

Thursday 13 April Lesson log 1.5H

Helen:

Summary: Paul entered today with a draft of his introduction and methods. At first, he still seemed a bit confused about the purpose and format of these -- the first part of the introduction was just quotes from the interview. We reviewed some example lab reports and then Paul revised his draft. He did a wonderful job summarizing the key points, motivation, and hypotheses of his experiment. We also talked at length about methods -- and how much detail to include so that a scientist could recreate the experiment. We also took all of the schematic knowledge which we had practised and put it to work on our fire alarm system! We created a block schematic of the fire alarm to juxtapose with his artistic recommendation.

Assignment: Draft a survey for the qualitative portion of the experiment. Finish the territory sketch with fire alarm markers and power connectors! Create a schematic based on the one we did together! Create an in-depth outline (bullet pointed) for the prompt: You are a physician and one of your patients has terminal cancer. Your patient requests physician asisted suicide, but its illegal where you live and they are unable to travel. Analyse where or not you should help them using the Georgetown Mantra.

Paul:

Summary: I finished the interview in its entirety, then we rewrote the introduction and methods I had written as part of my assignment and I looked at a lab report to see how they were actually written. We also drew a semi-schematic drawing of the fire alarm model, continued working with the lab report and for the break we had a typeracer race which Helen won. Helen continued in the series of micro-lectures on Stanford University life upon my request. This time she talked about how being a

student she had full access to the New York Times subscription, and many other resources, saying that Stanford has an enormous library and contains virtually every video game available.

One of my patients have terminal cancer, they have requested physician assistant suicide, but it's illegal where I live. Analyse your decision in terms of the Georgetown Mantra (Principlism). "I'd like you to create an in-depth outline, with bullet points" Helen. The patient is also unable to travel.

Friday 14 April Lesson log 1.5H

Helen:

Summary: It's really starting to be crunch time! Paul had created a very good survey as part of his homework, which we reviewed and then printed to be distributed tonight! Next, we talked about testing voltage. Paul and I used chatGPT to randomly generate 10 test locations on the map that Paul generated. We reviewed AC vs DC voltage and experimented with the voltmeter to see what happens when we flip probes, move probes around, and change scales. We decided on our test points and did an example test on one of the fire alarms!

Assignment: Draft an introductory paragraph to the physician assisted suicide prompt. Include *context* (history of physician-assisted suicide, what it is, where its legal, etc.). Draft a strong thesis!

Get survey responses. Write them into a table. Test all the locations on all the test points!! Don't hesitate to reach out to me if you need help!

Paul:

Summary: We completed the survey draft and printed that. We got a new voltmeter that worked and learnt how to test voltage and we probed into what I personally call "Gates of Heaven". We went to the room upstairs where we tested the voltage, and that was very exciting.

Sunday 16 April Lesson log 5H

Helen:

Summary: We finished with a marathon of a session! We split our time once more between our lab report and essay. Paul and I reviewed the data he had collected for his lab report, with special attention to the anomalies. Paul was great at coming up for theories for these anomalies! He also seemed to particularly enjoy creating visualisations and examining correlations for the survey data. We experimented with different kinds of charts and graphs to summarize and easily display the relationships between variables. Paul quickly grasped which graph works best for which kind of data. He had great ideas for improvements on the study as well! We went over his essay, including how to do an MLA style works cited with in-line citations. We tweaked his structure a bit and then he did one last round of revisions.

Assignment: Have a great time at school!

Paul:

14th of April: we did the last push, working on the lab report, writing the necessary texts and editing the last few mistakes. Then after the highlights of the session where I beat Helen at ping pong in a decisive victory, we went over some more on lab report, ding graphs, uploading photos and a quick last few minute doing the essay bibliography in a MLA format (or whatever the name is).

MID-INTERNSHIP ESSAY

**A patient had been declared brain dead by physicians.
Their family would not like to take them off life support for religious reasons.
Argue the best course of action using a utilitarian framework
and then provide a counter argument.**

In brain death, a patient is declared clinically and legally dead. A family wishes to continue providing life support to a brain dead relative. What course of action is best taken by physicians and the medical institution? I will argue that the utilitarian course of action remains inherently flawed due to its indecision and lack of unity. The solution lies in central authority.

The Uniform Declaration Death Act first formulated in 1981 defines brain death as when the brain and the brainstem irreversibly cease to function. The diagnosis contains three characteristics: permanent coma, the absence of brainstem reflexes and the incapability to breathe independently. The legal definition of brain death has been adopted widely as a medical standard although it is currently under review by the Uniform Law Commission.

Utilitarianism believes in actions that maximise good to the greatest number of people. The question is raised: how do we determine what is most important to optimise? The family wants continued life support because it brings them happiness. As such, the medical institution will receive less complaints by deterring possible discontent from religious communities. On the other hand, treating a 'corpse' every day can be mentally draining to medical staff. Furthermore, the hospital's reputation could be tarnished because dead patients would be treated instead of living patients that could die as a result. There is even a possible noncompliance to the law if religious exemption is banned. How can we effectively decide what brings greater satisfaction, money and respect? This ultimately results in indecision because so many factors are at play.

Utilitarians do not wish to optimise individual happiness because they only think in collective satisfaction. They contradict themselves and are steeped in an aura of indecision. Diverging interpretations amongst utilitarians on what party should be given priority results in disunity. There is no one with sufficient authority to solve the issue which will cause less efficiency. A lack of transparency and honest communication will create discontent and reinforce divisions in the community.

As such, the best course of action to be taken is a non-utilitarian approach that complies with the law. Contacting religious leadership to solve the issue will be key because they can have significant influence in a family's decision making. Doctors should show empathy and emotional support to the family whilst reaching a consensus. If the state does not allow religious exemption for brain death, then a possible hospital transfer might be the solution.



COMMON MORALITY THEORY:

PRINCIPALISM:

1. Respect for autonomy
example: primary

2. Beneficence

3. Non-maleficence

4. Justice
distribution

■ = DEONTOLOGICAL

■ = UTILITARIAN

Problems: Conflict between principles, no way to resolve it.

A patient is mildly 'metastatic' but she also has a delusion of 15 year pregnancy. She is refusing treatment because she does not want to hurt her "baby". What do you do?

- Respect for autonomy:
 - it's her choice
 - right to refuse treatment
 - cannot force a treatment.
- Beneficence:
 - best way home to help her to avoid death
 - It is their duty to de-delusionize her to pay and cure her.
- Non-maleficence:
 - they cannot perform a dirty trick, like no lies, coercion or just let her die.
- Justice:
 - can't blame the doctor in trouble if they don't help her and she dies. It's complicated.

TREATMENT SHOULD BE DONE!

Lab Report:

- Introduction:
 - Background
 - Context for experiment
 - Hypothesis: if we do this, then ...
- Method:
 - How things were set up
 - Expect for something to be able to measure.
 - Result
- Results:
 - All the measurements
 - Present on the part
 - No analysis or interpretation
- Discussion:
 - analyse our results
 - explain significance
 - relate it back to the hypothesis.
- Conclusion:
 - restate purpose
 - restate findings, i.e. summarize
 - note limitations, what next.

$$V = IR$$

~~E~~

$$P = IV$$

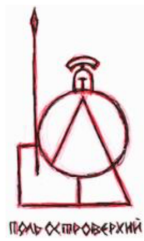
Voltage = The ~~energy~~ ~~power~~ drive, the pump of the river.

Current = the river whose flow is pushed by the charge.

Water molecules & charge, but the river is current. The pump is the voltage.



Power is current and voltage together.
"The flow of the river molecules" and the pump that provides the movement overall constitute power.



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