

Uriel Restrepo's IAPC

Gallatin embodies a philosophy where I can engage the learning process with a level of freedom allowing for the in-depth exploration of non-core topics, not just a survey of fundamental concepts. By studying within the field of computer science while examining how curiously it intersects with the humanities and other sciences, I have developed a fascination with the fields of machine learning, artificial intelligence, and interactive computing and most importantly how they can be integrated to enhance the lives of people in a manner never yet seen before. My friends, the future looks bright! In an effort to offer more insight and direction to an already mechanized field bursting with scientific and engineering advancements, I found it imperative to fuse this technical foundation with a more humanistic angle by including studies of ethics, philosophy, and sociology. I seek not only to understand the technical, but also the ethical and philosophical implications. Although, this information was not always as accessible.

Previous to my internships or classes in college, I had very little exposure to programming. Yet, somehow I knew the ability to use computation to solve problems would be a useful skill to obtain. Upon arriving to NYU, I began to partake in classes, internships, and independent study programs inclusive of all my interests which began to shape a desired holistic program of study.

At Courant I took courses mostly in computer science, but the ones that have inspired me the most have been: Interactive Computing, Database Design, Web Development, and Natural Language Processing. These courses influenced my understanding of what I believed computer science and artificial intelligence can be. They have helped me improve my understanding of how to attack humanistic problems using data, theoretical frameworks, and plain ingenuity. I now see the importance in developing my intuition to solve problems and keep up with recent developments in the field of CS.

No project or class has done more to improve my skills in programming more than Interactive Computing. The project I worked on that I still work from time to time is my Zombie Game. The game is a 2-D sideloading platform game where a player tries to survive by shooting zombies while running away to safety. It served as a final project as well as something I keep trying to perfect from time to time even now. More importantly the project forced me to learn and experience edge cases as well as my thought process when

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creating and holding in my head a complex program. I think this allows me now to better think through a problem, thinking about in discrete sections and to approach problems from a First Principles point of view. Although I find myself integrating my ever expanding knowledge base into my various personal projects, though one project started in Interactive Computing gave me a level of proficiency that is needed.

Having realized that I enjoy programming, especially simplifying tasks that before required a more manual or repetitive approach, these tasks have led me to further pursue studying artificial intelligence and computer/human interaction. Yet, I needed to understand more about the implications of such work.

At CAS and Gallatin, I have taken classes which have expanded my view to include how technology can impact society. Paul Thaler's Communication's Revolutions class allowed me to see the transformational effects various technologies had in this world. It made me consider ethical implications of technologies I had not yet considered and more importantly, now that my concentration will deal with computation and artificial intelligence, the implications my work will have on society. Karl Appuhn's Public Health in Early Modern Europe touched upon many similar topics but with a medicinal focus: how medicine evolved and how people used tools as extensions of themselves. This took me back to my roots where I had extensive exposure to biology and medicine before my life at NYU. It merged an initial interest in medicine with computer science and ultimately has inspired me to do a research paper or project that would culminate what I would like to pursue as part my concentration.

Concentration:

My concentration will be titled 'Creation and Artificial Intelligence' or 'Progress and Artificial Intelligence' and it will have a focus on Computer-Human Interaction. The various fields that overlap will include Computer Science, Artificial Intelligence, Computational Biology, Ethical Theory, and Philosophical Theory"

Plan for Concentration:

In the next 3 years of my study, I am going to keep pursuing the majority of my subjects in computer science to maximize my knowledge of the subject area but also in connecting fields of study while finishing my remaining Gallatin requirements.

My desire is to study the following topics in depth:

- Introduction to Machine Learning

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- Physical Computing
- Mathematical Techniques for Computer Science Applications
- Algorithms with Alan Siegel
- Physical Computing
- Deep Learning
- Parallel Computing
- Genomics
- Heuristic Problem Solving
- Big data analysis
- Computational Neuroscience

All these courses will be useful to help establish a fundamental understanding of artificial intelligence so that I may apply intuition to solve problems rather than simply focus on algorithmic knowledge. These courses include various forms of algorithmic problem solving and will allow me to test and train my knowledge of algorithms, in an even better, more practical manner.

For my Gallatin courses I'm aiming to take classes in:

- Utopia
- Finance for Social Theorists
- Understanding the Universe
- Achilles' Shield: Mapping the Ancient Cosmos
- Free Speech and Democracy
- Law and Legal Thought

On the humanities side of things, I intend to take more philosophy, psychology, law, ethics, and history classes not only because I have always been interested and fascinated with these topics, but also, I believe studying them will help isolate what issues are truly worth solving with computer science.

Communications Revolutions has created a profound impact in me desiring to understand the impact of technology in an ever-changing society. Utopia and Free Speech and Democracy I think will expand my understanding of the communities people build. Hopefully, I will be able to glean insight to how artificial intelligence will change for better or worse the future, but more importantly help me understand the implications of the technology I will bring into this world.

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I also have to complete my Gallatin Undergraduate requirement of 16 more units, 8 more units of Interdisciplinary Seminars as well as my "Historical & Cultural Foundation" which includes 4 more units in Social Science, and 4 units in the Premodern.

For the research paper or project, I have the idea to focus on AI in Medicine: Deep Learning and Computer-Human Interaction for more effective disease prevention and medical diagnosis. Although it may change, the project I have in mind is using deep neural networks for early stage skin disease and skin cancer classification. It is a project that I think I can approach, one that is connected to my interest in computational biology and my connection to medicine, and topic that has many burgeoning research papers that I may start on to begin my project.

By maximizing my exposure to a variety of information available through our extensive resources, extremely knowledgeable professors, and diverse network I have found myself constantly being inspired. Throughout this process of educational discovery, I am satisfied that I am part of a program that caters to both the development of particular skills as well as the acquisition of in-depth knowledge within a variety of disciplines.

After graduation, I am interested in working in the field of computational medicine or consumer software industry, hopefully in a fashion where I am able to develop novel artificial intelligence and machine learning approaches or uses. In this manner, I will be able to apply my well-rounded education into a professional as well as personal setting. I believe attending Gallatin has been the perfect way for me to explore my passions in a liberating way while helping me not lose track of the humanistic needs of society.