WRITING AN ABSTRACT

Sample 1: This experiment will determine what will make enzymes effective and what will make them ineffective. We tested different samples of enzymes in a spectrophotometer and recorded their absorption rates. Six samples were placed in the spectrophotometer but two contained no enzyme; these acted as blanks for the other samples. The four remaining samples contained Catecholase ranging from 0.5 ml to 1.75 m. The second half of the experiment contained four test tubes with a constant amount of Catecholase, but the pH levels ranged from four to eight. It was found that if the enzyme was present in large amounts, then the absorption rate was high, and if the pH level ranged from 6 to eight then the absorption rate was high. Therefore it can be said that enzymes work well in neutral pH levels and in large amounts.

Sample 2: This experiment was performed to determine the factors that positively influence enzyme reaction rates in cellular activities since some enzymes seem to be more effective than others. Catecholase enzyme activity was measured through its absorption rate in a spectrophotometer, using light with a wavelength of 540 nm. We compared the absorbance rates in samples with varying enzyme concentrations and a constant pH of 7, and with samples with constant enzyme concentration and varying pH levels. The samples with the highest enzyme concentration had the greatest absorption rate of 95 percent compared to the sample with the lowest concentration and an absorption rate of 24 percent. This suggests that a higher concentration of enzymes leads to a greater product production rate. The samples with a pH between six and eight had the greatest absorption rate of 70 percent compared to an absorption rate of 15 percent with a pH of 4; this suggests that Catecholase is most effective in a neutral pH ranging from six to eight.

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Sample abstracts

A

Computerized speech recognition takes advantage of the most natural form of communication, the human voice. During speech, sound is generated by the vocal cords and by air rushing from the lungs. If the vocal cords vibrate, a voiced sound is produced; otherwise, the sound is unvoiced. The main problem in speech recognition is that no two voices produce their sounds alike and that an individual voice varies in different conditions. Because voices do vary and because words blend together in a continuous stream in natural speech, most recognition systems require that each speaker train the machine to his or her voice and that words have at least one-tenth of a second pause between them. Such a system is called an isolated word recognition system and consists of three major components that process human speech: (1) the preprocessor which removes irregularities from the speech signal and then breaks it up into parts; (2) the feature extractor which extracts 32 key features from the signal; and (3) the classification phase which identifies the spoken word and includes the training mode and reference pattern memory. Spoken words are identified on the basis of a certain decision algorithm, some of which involve dynamic programming, zero crossing rate, linear predictive coding, and the use of state diagram.

Voice recognition systems offer many applications including data entry, freedom for mobility, security uses, telephone access, and helpful devices for the handicapped. However, these same systems also face problems such as poor recognition accuracy, loss of privacy among those who use them, and limited vocabulary sizes. The goal of the industry is the development of speaker-independent systems that can recognize continuous human speech regardless of the speaker and that can continually improve their vocabulary size and recognition accuracy.

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B

The problem of detecting gravitational radiation is receiving considerable attention with the construction of new detectors in the United States, Europe, and Japan. The theoretical modeling of the wave forms that would be produced in particular systems will expedite the search for and analysis of detected signals. The characteristic formulation of GR is implemented to obtain an algorithm capable of evolving black holes in 3D asymptotically flat spacetimes. Using compactification techniques, future null infinity is included in the evolved region, which enables the unambiguous calculation of the radiation produced by some compact source. A module to calculate the

waveforms is constructed and included in the evolution algorithm. This code is shown to be second-order convergent and to handle highly non-linear spacetimes. In particular, we have shown that the code can handle spacetimes whose radiation is equivalent to a galaxy converting its whole mass into gravitational radiation in one second. We further use the characteristic formulation to treat the region close to the singularity in black hole spacetimes. The code carefully excises a region surrounding the singularity and accurately evolves generic black hole spacetimes with apparently unlimited stability.

Luis Lehner, "Gravitational radiation from black hole spacetimes" Ph.D. University of Pittsburgh, 1998 DAI-B 59/06, p. 2797, Dec 1998

retrieved from: http://writingcenter.unc.edu/handouts/abstracts/

C

The Latitudinal Defense Hypothesis predicts that levels of defense are highest near the equator and decrease toward the poles. This hypothesis is based mainly on insect herbivory that occurs during the summer. Mammilian herbivory in the winter is a more likely driver of plant defense levels in northern latitudes. Early successional trees such as birches are favored by fire and provide an important food source for mammals like snowshoe hares. In order to test the Latitudinal Defense Hypothesis, we collected birch seeds from eight locations in northwestern Canada and grew seedlings in a common garden. We assessed levels of defense by counting resin glands because resin glands are negatively correlated with snowshoe hare preference. This research will provide valuable information regarding the biogeography of defense and address the role of fire in plant-mammal interactions on a continental scale.

Sarah Brown and Michael Stevens (Mentor), "Biogeography of Chemical Defense in Birch Trees"

D

Each day 14,000 people become infected with HIV/AIDS, making the development of an effective vaccine one of the world's top public health priorities. David Watkins' laboratory is attempting to develop HIV vaccines that elicit cellular immune responses utilizing the simian immunodeficiency virus (SIV) – infected rhesus macaque animal model. A major component of the cell-mediated immune response are cytotoxic T-lymphocytes (CTL). It is thought that CTL play an important role in controlling HIV and SIV. Most standard immunological assays do not measure antiviral activity directly, limiting our understanding of CTL effectiveness. To address this, the Watkins laboratory developed a novel neutralization assay that quantifies the ability of virus-specific CTL populations to control viral growth. Evaluating the antiviral activity of CTL of different specificities will identify those CTL most effective against SIV. This information will likely impact the design of future HIV vaccines.

Sean Spenser and John Loffredo, David Watkins (Mentors), "Understanding Cell-Mediated Immune Responses Against Simian Immunodeficiency Virus (SIV)"

E

The purpose of this study is to identify relationships between the physical and genetic characteristics of bones in mice. The physical characteristics include size, density, and the force required to break the bone, while the genetic ones are the genes of the marker loci associated with the genes that affect these qualities. This study uses strains of mice with reduced genetic variation. The two strains of mice that are the most phenotypically extreme, meaning those with the strongest and weakest bones, are crossed. The F2 generation from that cross is then analyzed. The results of this analysis can be used to find which genotypes correlate with specific bone properties like size, density, and failure load. The anticipated outcome of this lab is the identification of the genotypes that affect bone strength in mice. The findings may be useful in treating medical conditions that are related to bone strength.

Jonathan Vu and Robert Blank (Mentor), "The Genetics of Bone Strength in Mice"

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