



IPRO 321: Establishing an Undergraduate Research Journal

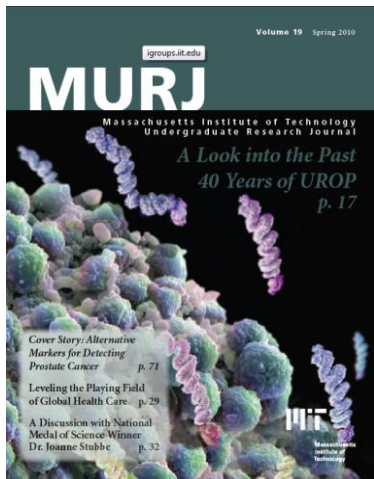
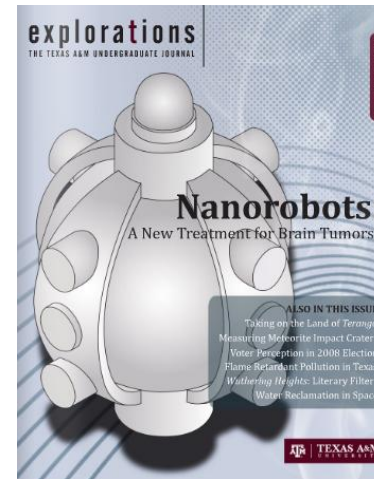
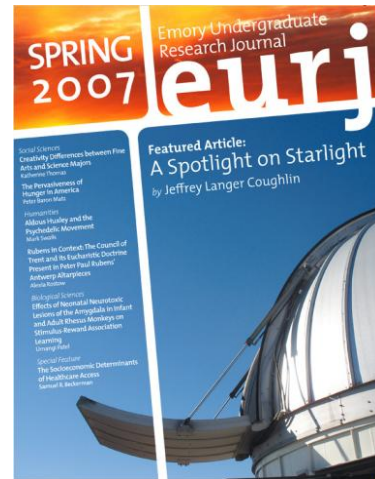
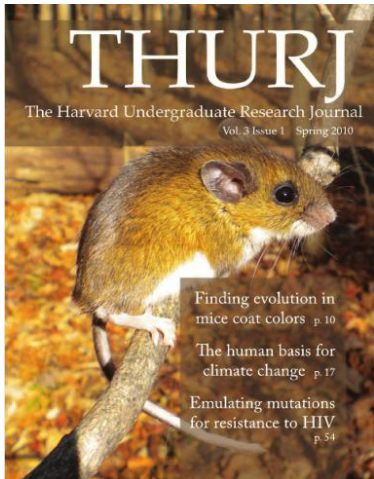
IPRO 321

Introduction

Team

Problem Solving & Project Work

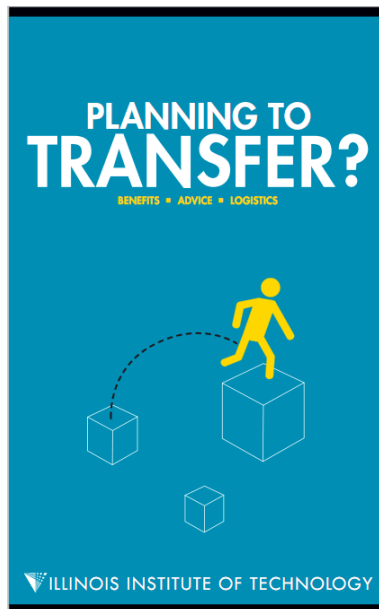
Achievements



???

What IIT does have:

- Office of Undergraduate Research
- ResearchWeb
- More than 29 research centers



“ As an undergraduate, you’ll have the opportunity to participate in faculty-led research alongside both undergraduate and graduate student — research that contributes important advances in a variety of fields. You might have the opportunity to present your findings at a national conference or **you might see your name published in a scientific journal.**”

Objectives

- Create editorial structure and peer-review process
- Design a print journal
- Develop a web site
- Receive IIT's official recognition
- Obtain stakeholder support
- Recruit students

Team Leaders

Meagan Sarratt



Ciaran Shaughnessy



Edit/Design

Saul Moreno



Chris Roberts



Bertha Vandegrift



Programming

Mike Dvorscak



Donald Taylor



Andrew Yates



Stakeholder

Sapna Desai



Scott Mochinski



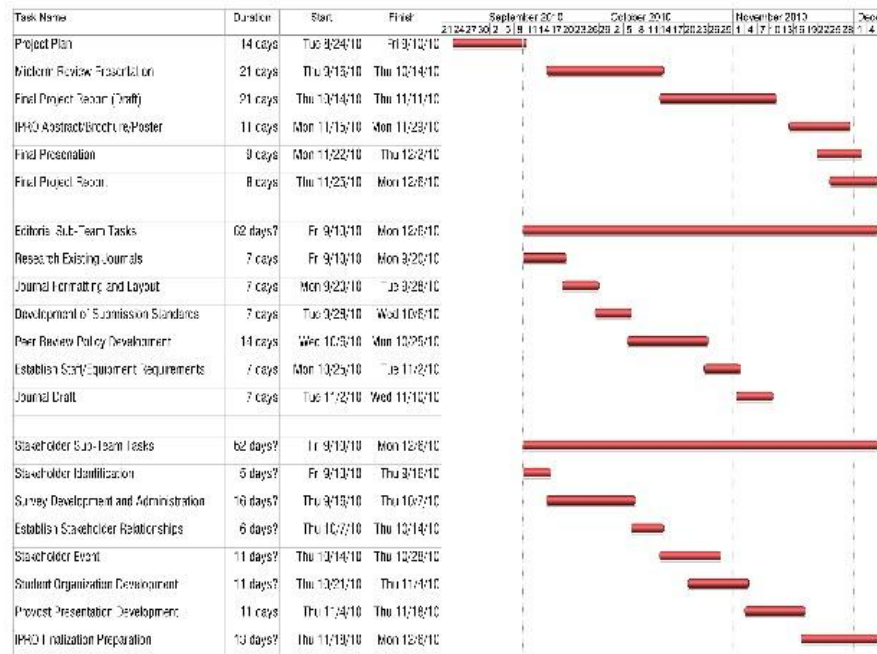
Sophia Pilipchuk



Adviser: Professor Robert Ellis

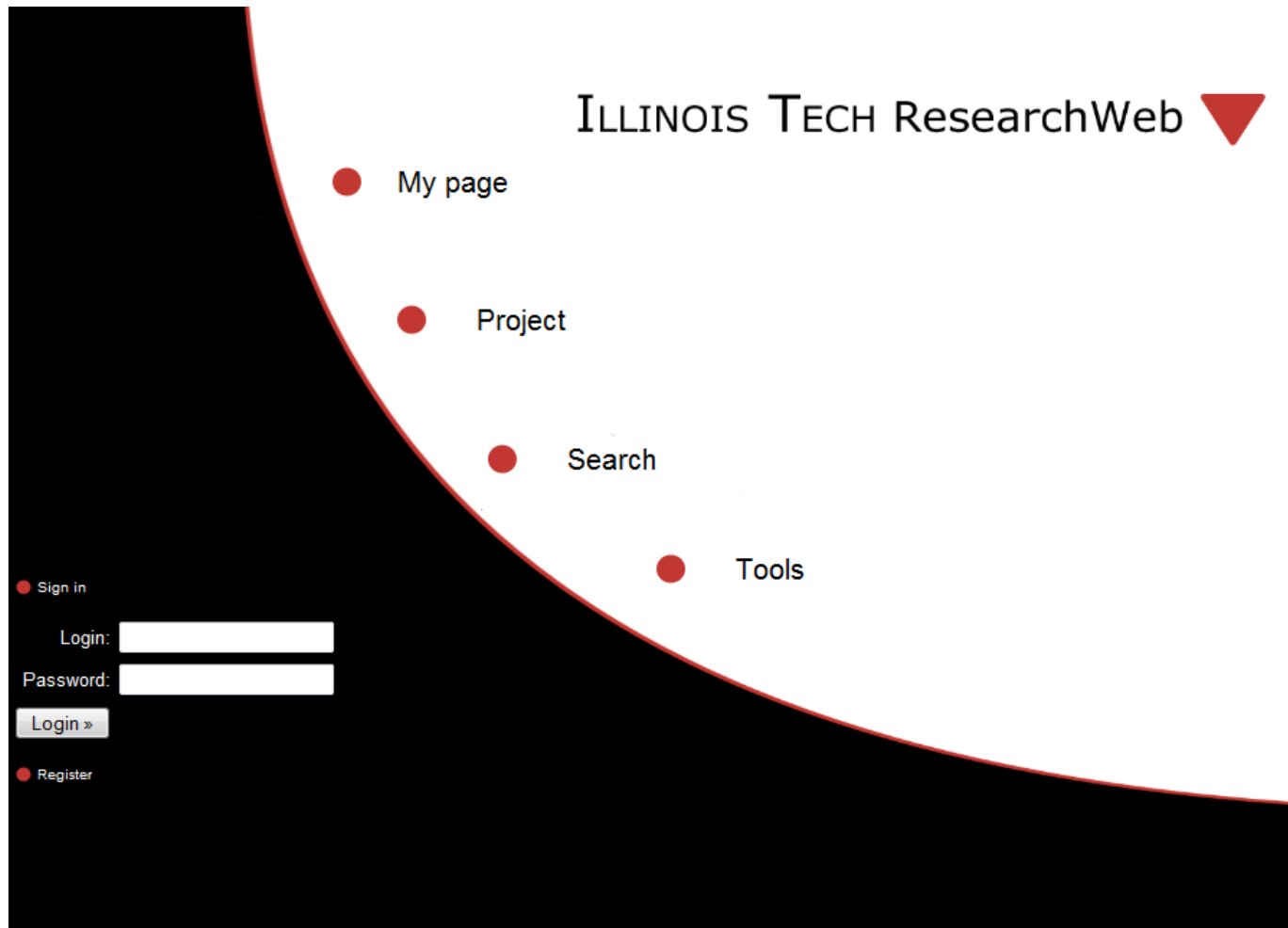
Team Dynamics

- Project plan developed at beginning of the semester
- Tasks assigned at meetings
- Entire team briefed by each sub-team at meetings
- Team goals and values aligned
- Continuous collaboration via meeting minutes/Google Docs



Gantt Chart

Fall 2009



Research Web Screenshot

Spring 2010[Home](#)[Positions](#)[Labs](#)[Conferences](#)[Tutorials](#)[Search](#)[Login](#)**Announcements**

Federal Work Study (FWS) funds are now available through the Office of Undergraduate Research (OUR) to support undergraduate research in the Fall 2010-Spring 2011 academic year. Positions must be posted and applied to here on ResearchWeb. For more information see the [announcement](#). FWS funds require a 25% match, and the OUR has some matching funds available through this [application](#).

Dates

- 2010-11-28 - [Radiology Society of North America](#)
- 2011-01-05 - [2011 Joint Mathematics Meeting](#)
- 2011-01-26 - [Principles of Programming Language](#)

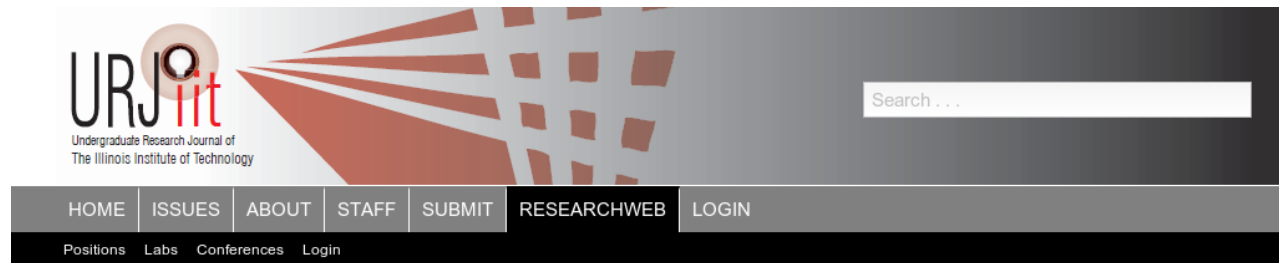
Welcome to ResearchWeb

ResearchWeb integrates and connects the current undergraduate students at Illinois Institute of Technology with colleagues, faculty members and resources. It facilitates the performance of undergraduate research at the Illinois Institute of Technology. It encourages undergraduates to get more involved in research.

- Guide undergraduate students in their first attempts to be part of a research team.
- Increase communication of research opportunities to IIT students.
- Ease the undergraduate research hiring process for professors.
- Enhance collaboration between current undergraduate researchers with colleagues working in different projects or laboratories.
- Disseminate information about upcoming research conferences and competitions.
- Enhance communication between current undergraduate researchers and undergraduates not involved in research who are interested in specific research projects.
- Facilitate the creation of undergraduate research journals.

Research Web Screenshot

Fall 2010

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Integrated URJiit/Research Web Screenshot

IPRO 321

Edit & Design Team

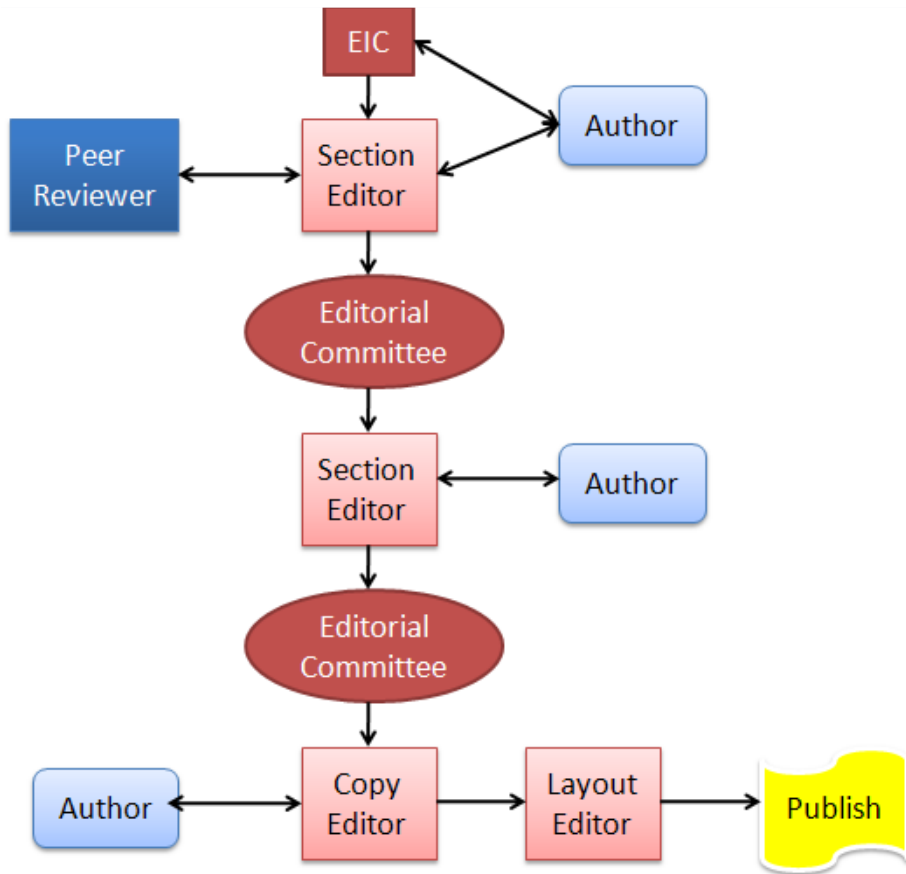
Researched:

- Editorial standards
- Submission guidelines
- Peer-review processes
- Print journal designs
- Web site layouts



Edit & Design Team

Peer-review Process



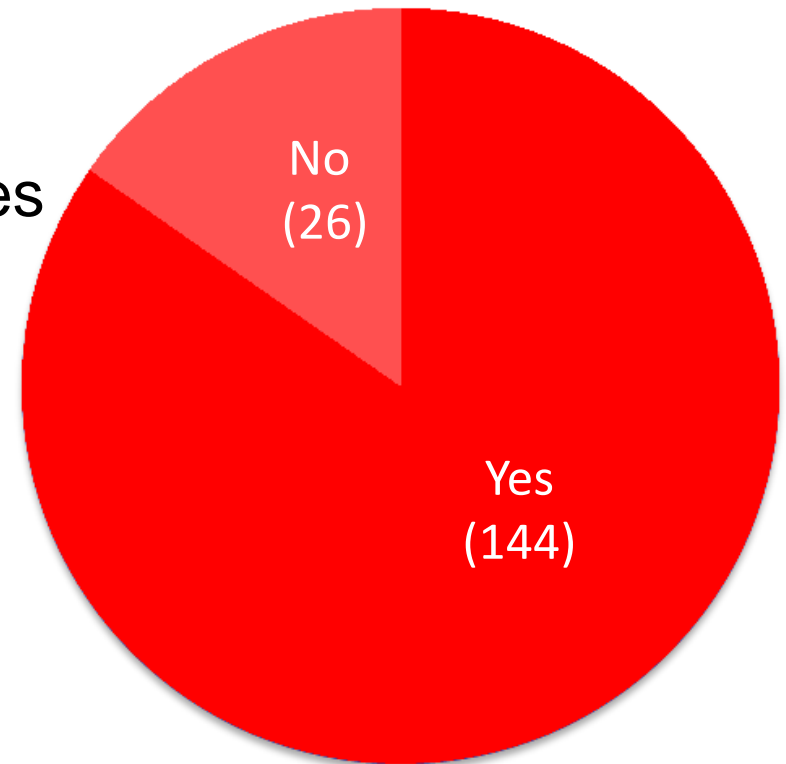
Staff Structure



Stakeholder Team

Researched:

- Common undergraduate journal practices
- University administration involvement
- Student interest



Student Interest in Reading Journal
(170 students surveyed)

Stakeholder Team

Engaged:

- Research faculty
- Student staff of other journals
- Student organization leaders
- IIT officials
- Stakeholders
- Potential faculty advisors



“My research experience has allowed me to gain broader insight into my chosen field of study and has given me the opportunity to better understand and apply the skills I learn in the classroom.”
– Sophia Pilipchuk, Biomedical Engineering



Programming Team

Researched

- Relevant technologies
- Web site usability
- myiit compatibility
- ResearchWeb integration



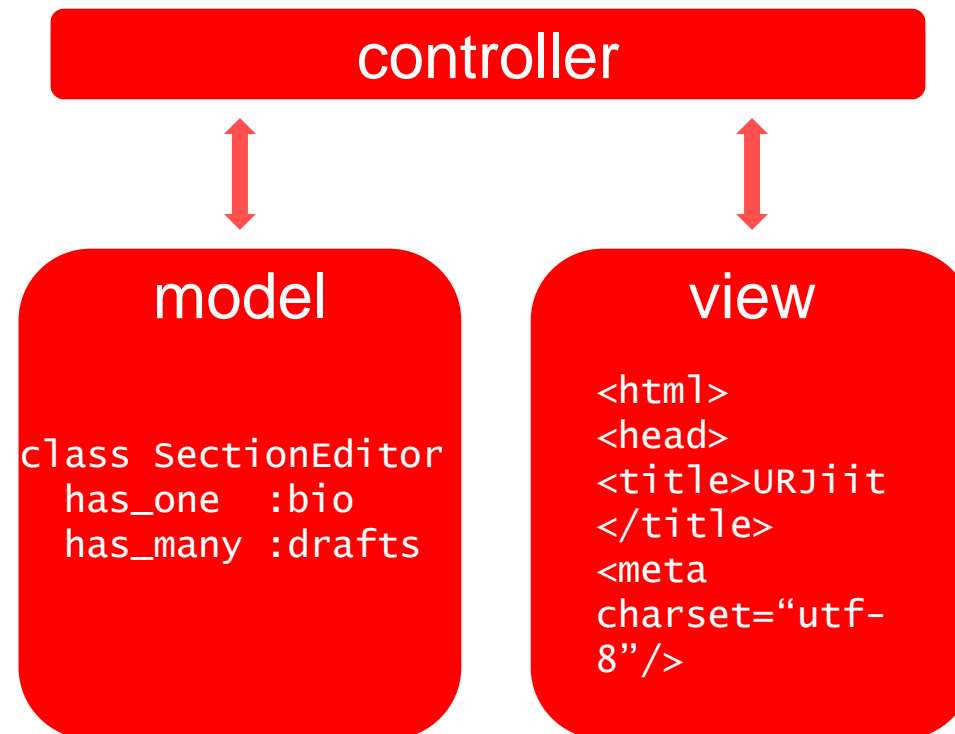
Ruby Programming Language

Programming Team

Developed

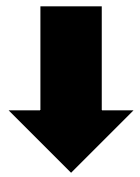
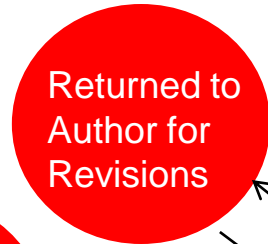
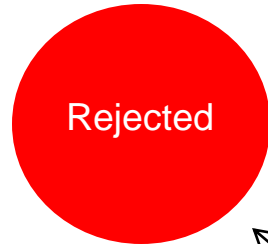
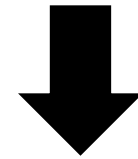
- Model
- Controller
- View

Model-View-Controller Design



Programming Team

Student Author



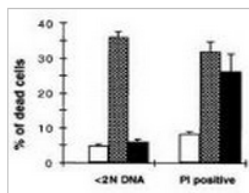
Online & Print Issues

Finite-state machine modeling editorial process





BAX-induced cell death may not require interleukin 1 beta-converting enzyme-like proteases



Xiang J, Chao DT, Korsmeyer SJ
Expression of BAX, without another death stimulus, proved sufficient to induce a common pathway of apoptosis. This included the activation of interleukin 1 beta-converting enzyme (ICE)-like proteases with cleavage of the

endogenous substrates poly(ADP ribose) polymerase and D4-GDI (GDP dissociation inhibitor for the rho family), as well as the fluorogenic peptide DEVD-AFC. The inhibitor benzyloxycarbonyl-Val-Ala-Asp-fluoromethyl ketone (zVAD-fmk) successfully blocked this protease activity and prevented FAS-induced death but not BAX-induced death. Blocking ICE-like protease activity prevented the cleavage of nuclear and cytosolic substrates and the DNA degradation that followed BAX induction. However, the fall in mitochondrial membrane potential, production of reactive oxygen species, cytoplasmic vacuolation, and plasma membrane permeability that are downstream of BAX still occurred. Thus, BAX-induced alterations in mitochondrial function and subsequent cell death do not apparently require the known ICE-like proteases.

IIT Undergraduate Research Journal

The Illinois Institute of Technology's new journal to shine a light on undergraduate research

News

- 12-02-2010 **Accepting staff position applications**
- 11-29-2010 **URJit receives IIT's official recognition**

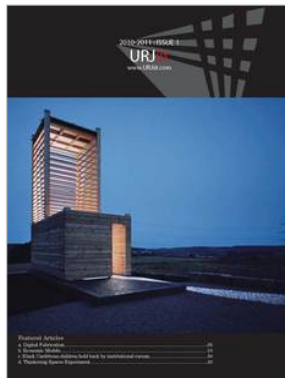
ResearchWeb Opportunities

ResearchWeb connects undergraduate students at the Illinois Institute of Technology with colleagues, faculty members, and resources. It facilitates the performance of undergraduate research at the IIT. ResearchWeb also encourages undergraduates to get more involved in research.





← Previous 1 **2** Next →



Issue 1 - Fall 2010

Exercitationem: Margret Parker

Et est dolor nihil incidunt sequi accusamus. Et possimus accusamus facere fuga consectetur. Quam sunt dolor recusandae ducimus. Temporibus voluptatum distinctio dignissimos. Sit aliquid qui et.

[View Full Article](#)

Et iusto Quas Et Ut: Alisha Nitzsche

Qui adipisci asperiores molestias nisi amet. Non dicta dolores perspiciatis voluptates non. Necessitatibus minus voluptas nihil. Sint maxime error voluptatem exercitationem accusantium ut quia.

[View Full Article](#)

Illo Alias Quidem Temporibus: Freeman Lowe

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[View Full Article](#)





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Methods

- Brainstorming
- Iterative prototyping
- Surveying
- Strategic planning
- Unit testing
- User-centered design



MICROCOSMIC LINEAR REGRESSION ALGORITHMS AND MODELLED SUBSIDIARY APPLICATIONS

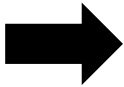
JANA DUB - DEPARTMENT OF COMPUTER SCIENCE - SEPTEMBER 28, 2008

ABSTRACT

Linear regression is one of the most common statistical methods used in data analysis. It is a simple and effective way to model the relationship between two variables. In this paper, we present a new method for linear regression, called Microcosmic Linear Regression (MLR). MLR is based on the idea of using small, local models to approximate the global relationship between the variables. This method is more robust to outliers and noise than traditional linear regression. We also present a modelled subsidiary application of MLR, which is used to predict the performance of a system based on its configuration. The results show that MLR outperforms traditional linear regression in terms of accuracy and robustness.

INTRODUCTION

Linear regression is a statistical method for modeling the relationship between two variables. It is one of the most common methods used in data analysis. The basic idea is to fit a straight line to a set of data points. This line is then used to predict the value of the dependent variable for a given value of the independent variable. There are many different methods for fitting a line to a set of data points. The most common method is the method of least squares. This method finds the line that minimizes the sum of the squares of the residuals. There are many other methods for fitting a line to a set of data points. Some of these methods are more robust to outliers and noise than the method of least squares. In this paper, we present a new method for linear regression, called Microcosmic Linear Regression (MLR). MLR is based on the idea of using small, local models to approximate the global relationship between the variables. This method is more robust to outliers and noise than traditional linear regression. We also present a modelled subsidiary application of MLR, which is used to predict the performance of a system based on its configuration. The results show that MLR outperforms traditional linear regression in terms of accuracy and robustness.



P Am College of Science and Letters IIT Undergraduate Research Journal Fall 2010 Volume 1 - Issue 1

The Mathematics of Quantum Neutrino Fields

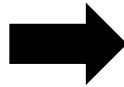
Jana Dub — Applied Mathematics — Senior
John Smith — Physics — Junior
Faculty: Prof. Hubert Farnsworth — Physics

ABSTRACT

Quantum neutrino fields are a subject of ongoing research in particle physics. In this paper, we explore the mathematics of these fields. We start by reviewing the basic concepts of quantum field theory and neutrino oscillation. We then discuss the specific mathematical challenges associated with neutrino fields. Finally, we present our own research in this area. We show that the mathematics of neutrino fields is closely related to the mathematics of other quantum fields, but with some important differences. Our results suggest that there may be a deeper connection between the mathematics of neutrino fields and the mathematics of other quantum fields.

Introduction

Quantum field theory (QFT) is the framework for describing the interactions of particles at the most fundamental level. It is a combination of quantum mechanics and special relativity. In QFT, particles are described as excitations of underlying quantum fields. The interactions between particles are then described as interactions between these fields. One of the most interesting areas of research in QFT is the study of neutrinos. Neutrinos are elementary particles that have a very small mass and interact very weakly with other particles. They are produced in many different processes, including the decay of other particles and the fusion of protons in the sun. Neutrinos are also one of the most abundant particles in the universe. The study of neutrinos is therefore an important part of modern physics. In this paper, we focus on the mathematics of quantum neutrino fields. We start by reviewing the basic concepts of QFT and neutrino oscillation. We then discuss the specific mathematical challenges associated with neutrino fields. Finally, we present our own research in this area. We show that the mathematics of neutrino fields is closely related to the mathematics of other quantum fields, but with some important differences. Our results suggest that there may be a deeper connection between the mathematics of neutrino fields and the mathematics of other quantum fields.



BAX-induced cell death may not require interleukin 1b-converting enzyme-like proteases

Jing Wang
College of Science & Letters — Biology

ABSTRACT

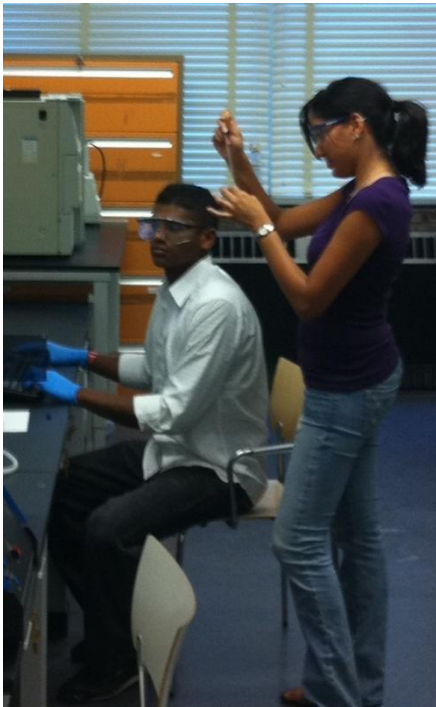
BAX is a pro-apoptotic protein that is involved in the regulation of apoptosis. It is a member of the Bcl-2 family of proteins. BAX is known to form a pore in the membrane that allows the entry of cytochrome c into the nucleus, which leads to cell death. In this paper, we investigate whether the induction of cell death by BAX requires the activity of interleukin 1b-converting enzyme-like proteases (ICEs). We show that BAX-induced cell death can occur in the absence of ICEs. This suggests that the induction of cell death by BAX does not require the activity of ICEs. Our results provide new insights into the mechanism of BAX-induced cell death.

Introduction

Apoptosis is a programmed form of cell death that is essential for the development and maintenance of multicellular organisms. It is a highly regulated process that involves the activation of a series of proteases called caspases. One of the most important caspases is caspase-3, which is responsible for the execution of apoptosis. The activation of caspase-3 is regulated by a number of different factors, including the Bcl-2 family of proteins. BAX is a pro-apoptotic protein that is a member of the Bcl-2 family. It is known to form a pore in the membrane that allows the entry of cytochrome c into the nucleus, which leads to cell death. In this paper, we investigate whether the induction of cell death by BAX requires the activity of interleukin 1b-converting enzyme-like proteases (ICEs). We show that BAX-induced cell death can occur in the absence of ICEs. This suggests that the induction of cell death by BAX does not require the activity of ICEs. Our results provide new insights into the mechanism of BAX-induced cell death.

Benefits

- Students gain experience reviewing and writing
- Students are rewarded for conducting research
- IIT can showcase its research programs and opportunities



Ethical Considerations

- Personal data privacy
- Team conflict resolution
- Submission confidentiality
- Peer review process
- Author education
- Conflict of interest

Innovation

- URJit web site integrated with ResearchWeb
- IPRO inclusion
- Video and poster submissions



Introduction

In 2006, this project investigated the psychosocial benefits of scuba diving for individuals with acquired physical impairments. In-depth, semi-structured interviews were conducted with 3 volunteers recruited from a diving club specializing in training people with disabilities to scuba dive.

Scuba diving is typically associated with young, fit, adventurous individuals. Although programs to teach people with disabilities to scuba dive have been around since the late 1970s, to date, no publication devoted solely to the examination of psychosocial aspects of diving for people with physical impairments exists.

This research also incorporates the Theory of Optimal Experiences or Flow. Flow is defined as a state in which people carrying out certain activities gain intrinsic rewards from the activity, whether it is accompanied by intrinsic rewards or not.

Method

A phenomenological research design incorporated within a qualitative method was used for this study. Phenomenology describes experiences of phenomena and is concerned with the way people perceive their existence in the world.

An advertisement was placed on the notice board of a Welsh diving club that specializes in diving for people with disabilities. Three male participants agreed to take part in this study. The three were given a 20-question survey to answer. People with congenital disabilities or those who knew how to dive prior to the onset of a disability were excluded.

Responses to the survey were analyzed by highlighting emergent themes from the data collected. The responses were searched for key words and the repetition of common responses.

Psychosocial aspects of scuba diving for people with physical disabilities: An occupational science perspective
Gail Carin-Levy & Derek Jones

Subject Characteristics					
Subject	Age	Disability	Years Diving	Years Since Injury Occurred	Whether Is User?
1	33	Below knee amputation	3	8	No
2	47	Spinal cord	< 1	21	Yes
3	33	Spinal cord	1	8	Yes

Results

The most activity-specific response was that all the subjects felt free from their impairments while scuba diving. This is related to their feeling of being equal to people without disabilities while diving noting that, "everyone looks the same while diving."

All subjects reported a widening of social circles through diving, meeting and interacting with divers both with a disability and without a disability. Subjects also referred to involvement in the "diving scene" noting that while diving, more time is spent out of the water than in the water. Divers also mentioned the uniqueness of "dive buddies."

All subjects expressed a feeling of increased self-concept. Subjects experienced an enhanced sense of competence, control, and independence.

Conclusions

Scuba diving offers several psychosocial benefits/advantages:

- Freedom from impairment
- Enhancement of self-concept
- Socialization experience
- Equality with others

Flow - The Optimal Experience
Further research needed

Objectives

- Create editorial structure and peer-review process
- Design a print journal
- Develop a web site
- Receive IIT's official recognition
- Obtain stakeholder support
- Recruit students

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+

- ✓ Officially recognized student organization

Future of URJiit



URJiit
Undergraduate Research Journal of
The Illinois Institute of Technology

Search Site / Article

HOME RESEARCH ABOUT STAFF CONTACT SUBMIT RESEARCH WEB

Learning to Select Robotic Grasps Using Vision on the Stanford Artificial Intelligence Robot
Lawson Wong

Grasping is an essential ability for manipulation; for robots such as the Stanford Artificial Intelligence Robot (STAIR) to be resourceful in real-world environments, they must know how to grasp. While this is a well-studied problem in the case when a full 3-D model of the target object is known, it is difficult for real-world scenarios, where the robot must rely on imperfect perception to model the scenario. This paper presents a novel approach for grasping that only uses local 3-D information acquired from sensors. Given data of the environment from 3-D sensors, our algorithm generates arm/hand configurations that may potentially achieve a good grasp, then computes features of these candidates to select the best candidate and execute its grasp. These features capture desirable properties of potential grasps based on sensor data, which our learning algorithm then uses to predict how likely the grasp will be successful. This algorithm was tested on STAIR in real-world grasping of single objects and of objects in cluttered environments. Significant improvements in both cases were found.

IIT UNDERGRADUATE RESEARCH JOURNAL
The Illinois Institute of Technology's first Journal to shine a light on the development and collaboration of Undergraduate research

NEWS!

08.17.10 SUBMISSIONS ARE NOW BEING ACCEPTED
► Read More

08.20.10 SUBMISSIONS ARE NOW BEING ACCEPTED

09.30.10 OTHER

RESEARCH WEB

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10.21.10 American Society of Engineers Annual Conference

10.26.10 ACM International Conference on Information and Knowledge Management

10.27.10 Society of Hispanic Professionals and Engineers

THE FIRST RESEARCH JOURNAL AT THE PALM OF YOUR HANDS!
Share information This algorithm was tested on STAIR in real-world grasping of single objects and of objects in cluttered environments. Significant improvements in both cases were found.

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Volume 1
2011

URJiit
Undergraduate Research Journal
of Illinois Institute of Technology

Architecture — Business — Engineering — Psychology — Science & Letters — Technology

IPROs Go Green

Proteins of Platypus Venom

CSL Awards Summer Undergrad Research Stipends

The Soviet Union and the Six-Day War

Economic & Political Results of Cuts to Fermilab Funding

Acknowledgements

Thank you to all who were involved in the establishment of URJiit. Your support and encouragement has been invaluable to the success of this project.

Special thanks to:

Eric Brey, Assistant Dean, Office of Undergraduate Research

Mike Gosz, Vice Provost, Undergraduate Academic Affairs

Gerry Doyle, Vice Provost, Undergraduate Admissions

Jenifer Keplinger, IPRO Program Coordinator, Interprofessional Projects Program

Carlo Segre, Professor of Physics, URJiit Faculty Advisor

Siva K. Balasubramanian, Associate Dean, Stuart School of Business

Kathleen Nagle, Studio Assoc. Prof., Architecture

Paul Pettigrew, Studio Assoc. Prof., Architecture

Stephen Sennot, Assist. Dean of Academic Affairs, Architecture

Charles Uth, Senior Engineering Librarian, Galvin Library

Carol DeBiak, Science/Mathematics Librarian, Galvin Library

Donna Robertson, Dean, College of Architecture

Natacha DePaola, Dean, Armour College of Engineering

Russell Betts, Dean, College of Science and Letters

Harvey Kahalas, Dean, Stuart School of Business

Ellen Mitchell, Dean, Institute of Psychology

