



University of Michigan Undergraduate Research Journal



Presents:

THE ZINE

Winter 2010



Editorial Board

Editors in Chief:
Yezi Peng
Bhargavi Sampath

Associate Editors:
Grace Zhu
Olivia Chitkara
Alex Myong
Sandhya Simhan

Graphics/Tech:
Sumit Gupta
Ahmed Al-Khafaji

Publicity:
Rebecca Sliwoski
Mavia Parveen

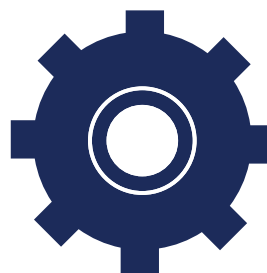
External Relations:
Zubair Ahsan

Internal Relations:
Anirudha Rathnam

Copy Editors:
Choi Li
Mohammad Jawed
Derek Wood
Sarah Lewin
Susan Yang
Ana Progovac
Haili Pang
Jana Pohorelsky
Colin Yee
Sunil Agarwal
Stephanie Kraftson

Contents

Letter from the Editors	2
Public Health	
Swine Flu “Mythbusters”	3
Interview: Dr. Ken Warner	4
Vegetarianism	
Vegetarianism & the Environment: the Need for Sustainable Diets	5
In Their Words	7
Interview: Professor George Estabrook	9
How to...	
How to Get Involved In Research	11



Editors' Note

Dear Readers,

The UM Undergraduate Research Journal is a student-run organization dedicated to publishing multidisciplinary undergraduate research. We aim to raise awareness of the expansive breadth of work done by University of Michigan students and faculty in humanities, social sciences, natural sciences, and engineering. Our focus on multidisciplinary research is reflected by the wide array of concentrations represented by our Editorial Staff, from Aerospace Engineering to Political Science.

It has been a wonderful experience working with a creative and dedicated team to publish this pamphlet. This is our first-ever 'zine', a supplement to our 7th journal issue, which comes out in April 2010. In this publication, we have focused on two relevant topics of today: issues of public health – such as swine flu – and the shifting trends of vegetarianism.

On behalf of the entire UMURJ Editorial and Production staff, we would like to thank you for reading this publication. It has been a great experience putting this together, and we hope it furthers your appreciation and interest in the dynamic world of research.

Sincerely,

Yezi Peng and Bhargavi Sampath

Editors in Chief



Swine Flu “Mythbusters”

Jana Pohorelsky, Alex Myong, & Stephanie Kraftson

Myth or Fact: Swine flu is a pandemic.

Fact! In June of 2009, the World Health Organization officially labeled the H1N1 virus (commonly known as Swine flu) a pandemic, making it the world’s first official pandemic in 41 years. The difference between an epidemic and a pandemic is that in an epidemic, the contagious, infectious or viral illness spreads throughout one geographic region, while in a pandemic, the illness spreads in many areas across the globe. However, recent studies by specialists from Imperial College London and from the US Center for Disease Control and Prevention are showing that swine flu is less contagious than pandemics in the past.

Myth or Fact: Swine flu is mutating uncontrollably.

Myth! Similar to the seasonal flu, the H1N1 virus has demonstrated the capacity for relatively rapid mutation, but scientists have yet to identify a widespread circulation of a more deadly mutated strain of swine flu. In November of 2009, Norwegian health authorities reported the identification of a mutation potentially related to the presence

of particularly severe symptoms in infected patients. They also stated, however, that this specific mutation did not appear to be circulating in the population but rather arose spontaneously in incidents isolated to the three individuals infected. Thus far, the mutations that have surfaced have not altered the apparent effectiveness of the H1N1 vaccine and researchers are still closely following the evolution of the virus.

Myth or Fact: The elderly are the most susceptible.

Myth! Studies show that, unlike the seasonal flu, the risk of infection, hospitalization, and death from H1N1 among people of age 65 and above is less than the risk for those in younger age groups. One explanation for this pattern is that adults in this older age group may have had previous exposure to the virus that renders them immune to the 2009 strains. Vaccination against H1N1 is recommended for young people (ages 6 months through 24 years) because they tend to be in close contact through school (or day care) and are usually highly mobile, meaning that they have a

high potential to spread the illness. Pregnant women are also encouraged to be vaccinated because they are at risk for complications from Swine flu and are capable of protecting infants who can’t be vaccinated (i.e. persons under six months). Older persons are prioritized for vaccination only if they live with or care for infants under 6 months or are a healthcare worker.

Myth or Fact: Individuals infected with Swine flu take longer to recover.

Myth! Actual recovery time depends on each individual’s immune system, however, the general recovery period appears to be anywhere from a few days to a couple weeks. Doctors can also administer anti-viral drugs that speed recovery by a few days, but they are currently reserved for the most severe cases of H1N1. Infected individuals should also keep in mind that H1N1 appears to be contagious for a longer amount of time than the seasonal flu.

Myth or Fact: Wearing a facemask and washing your hands will protect you.

Debated! What you probably didn’t know is that there are two different types of masks. One is the typical facemask, which primarily helps prevent the spread of droplets but not small particles. The other is a respirator, which more effectively filters out those small particles. Although it may seem that a respirator is thus more effective, federal health officials frankly admitted that they didn’t know how helpful either mask was. Wearing a mask will probably reduce the risk of swine flu in close contact, but it does not provide 100% protection. Health experts advise that masks used in combination with other preventative measures such as washing hands, staying at home and avoiding crowds is a more effective approach in avoiding swine flu.

Interview: Dr. Ken Warner

Derek Wood & Ana Progovac

Dr. Ken Warner has been Dean of the UM School of Public Health since 2005. He stumbled upon Public Health from a background in Economics, and since that career move his research has focused on preventing disease and promoting health through economic and policy measures with a focus on tobacco policy. He also worked to initiate and currently teaches the first and only undergraduate Public Health course (HMP 200: Introduction to Public Health).

How would you define public health?

Public health is the set of activities a society undertakes to monitor and improve the health of its collective membership. It has three distinguishing features: a focus on *preventing* disease & injury, the idea that the “patient” is the entire community (not individuals); and that the “provider” is society (and not individual professionals).

What roles have you taken on as dean that are important or different?

I relate to a large number of people now about public health much more generally than what I’ve done in the past. I get asked things as if I’m an expert on everything. I certainly represent



the school in many locations where we’re talking about big broad health issues, so a lot of my canned speeches will have references to the health reform debate for example, but I’m always personally leery of trying to over-represent my expertise.

What does someone usually do with a masters in public health degree?

Public health is a huge field – if you simply look at the names of our five departments: Health Behavior and Health Education, Health Management and Policy, Biostatistics, Epidemiology, and Environmental Health Sciences, they themselves are sufficiently different to suggest the breadth of positions and jobs available. We have a large number of people who work for consulting firms, people who go work in Congress as aides to legislative committees, and at the Centers for Disease Control and Prevention (CDC). The corporate sector also

hires a lot of our graduates for health policy advice – some pharmaceutical companies in the past years have hired graduates of ours to evaluate new policies coming from Washington D.C. A quarter of our students are PhD students who go on to become researchers as well.

Why was it important to you to launch the undergraduate public health class?

This is a field that most people do not understand or can easily define. It’s not something like law or medicine – no one comes to college thinking ‘I’m going to go into public health’. I thought the class could function simply as a device for exposing some undergraduates to the field. I hoped it would be successful in helping to recruit students into the profession and some of them into our school. I’ve been saying we ought to do this for a good twenty years. I finally decided it was time to put our collective money where my mouth has always been and do the class. It’s been really fun, and it’s a great group of people. We were worried we wouldn’t get more than thirty people; we figured undergraduates don’t look for public health courses, since all previous public health courses have been for graduate and professional students. All of sudden we started getting flooded with requests, and we filled up quickly. We decided 140 textbooks was a good place to stop. Next year if this goes well, and there’s enough demand, we’ll probably open the course up to more students.



Vegetarianism & the Environment: *the Need for Sustainable Diets*

Stephanie Kraftson, Jana Pohorelsky, & Alex Myong

Along with the current trend of eating organic and locally produced foods, one of the hot topics that has sparked debate among scholars and bloggers alike is the question of whether or not being a vegetarian affects the environment. Though we often think of vegetarianism as a lifestyle chosen as a result of dietary limitations or desires to promote health and improve the treatment of animals, many people are beginning to ask, “Does vegetarianism actually benefit the environment as well?” Those who contend that vegetarianism has a positive effect on the environment argue that the mass production of animal products for human consumption can lead to land degradation, water and air pollution, and even a change in

climate.

In 2000, the World Health Organization reported that one in every three people suffered from malnutrition as a result of rapid population growth and diminished land, water, and energy resources.¹ Therefore, in response to the public’s increasing concerns about our impact upon the earth, scientists have begun to research ways in which we can positively influence our environment. In a 2009 Californian study comparing the environmental effects of vegetarian versus non-vegetarian diets, the researchers asked, “Does animal consumption create a heavier footprint than a vegetarian diet?”

1 World Health Organization (2000). Turning the Tide of Malnutrition: Responding to the challenge of the 21st Century. World Health Organization: Geneva.

and “If so, what are some of the major environmental effects of an animal-based diet, and how might these be measured?”² They found that a non-vegetarian diet consumed 2.9 times more water,¹ 2.5 times more primary energy, 13 times more fertilizer, and 1.4 times more pesticide than a vegetarian diet.² The statistics suggest that vegetarian diets are, in fact, less taxing on the environment. Furthermore, these researchers support the notion that increased environmental degradation is a byproduct of increased agricultural output. Modern agriculture has prioritized optimum crop yields and animal farming to the detriment of the environment via increased energy output, use of natural resources, and generation of waste.

This data raises another question, however: whether vegetarian diets are sufficiently sustainable or are simply more sustainable than animal-based diets – that is, are current vegetarian diets “enough”? The majority of recent studies have focused on the comparison of non-vegetarian and vegetarian diets, but have yet to offer concrete

2 Diet and the environment: does what you eat matter? Marlow HJ, Hayes WK, Soret S, Carter RL, Schwab ER, Sabaté J. Am J Clin Nutr. 2009 May;89(5):1699S-1703S. Epub 2009 Apr 1.

conclusions on the practicality of mass implementation of environmentally friendly diets. However, *The European Journal of Clinical Nutrition* study points to the importance of considering two factors: "(1) people generally and openly display extreme reluctance to change their eating habits¹; (2) a change

Have you ever considered becoming a vegetarian?

46.4%	Yes
53.6%	No

Among UM students surveyed.

in the eating habits and in the dietary trends of developing countries may play an important role in the arrest and reversal of some major current environmental trends."³ If future studies can integrate these suggestions, then perhaps we will come closer to an effective solution to our increasing environmental concerns.

Yet even if academia has found that vegetarian diets positively affect the environment, has this been accepted by laypeople? Whether you do a google search for "vegetarian and environment debate" or "anti-vegetarianism,"

³ Evaluating the environmental impact of various dietary patterns combined with different food production systems. Baroni L, Cenci L, Tettamanti M, Berati M. *Eur J Clin Nutr.* 2007 Feb;61(2):279-86. Epub 2006 Oct 11.

the popular consensus among bloggers on the Internet seems to be that being a vegetarian does have positive effects on the environment. The question for many, it appears, is not "does being a vegetarian help the environment?" but "how realistic is it to be vegetarian?" and "what is my personal choice to become a vegetarian?" These queries produce more nuanced responses.

If you ask google.com "does being vegetarian help the environment," the answers from multiple websites resound with the following explanations: meat-eating destroys natural habitats, the meat-industry produces greenhouse gases, and raising animals for slaughter leads to an inefficient use of agricultural land. One website,

The question for many, it appears, is not "does being a vegetarian help the environment?" but "how realistic is it to be vegetarian?" and "what is my personal choice to become a vegetarian?"

called "chooseveg.com," cites Dr. David Brubaker of Johns Hopkins University to sum up these consequences of meat consumption: "It pollutes our environment while consuming huge amounts of water, grain, petroleum, pesticides and drugs. The results are disastrous."⁴ Even websites that are yielded

⁴ <http://www.chooseveg.com/environment.asp>

from a search into "anti-vegetarianism" confirm that maintaining a vegetarian diet is healthy for both the individual and the environment. Anti-vegetarians, such as those who post on the website for the "Anti-Vegetarian Society of Meat-Eaters," don't implicate the environment in their arguments that endorse meat-eating. Instead, they focus on the issue of personal liberty to choose to eat meat: "We continue to see activist and political efforts aimed at being the "Kitchen Police," telling people what they can and cannot eat."⁵ It appears that the voice of opposition is not against vegetarianism, but rather the challenge to the personal choice of eating meat.

But anti-vegetarianists aren't
⁵ www.freewebs.com/avsme

the only people who call upon the rhetoric of "choice" with regards to eating or not eating meat: many vegetarians address environmental concerns while specifying that these were not their primary reason for "going vegetarian." Spiritual reasons and animal cruelty are just two of a variety of motives that bloggers cite as more

I'm Jain, so it's a fundamental part of my religious beliefs. We believe that all animals are sentient beings, and that we shouldn't allow any sentient beings to feel unnecessary pain. Also, my entire family is vegetarian and it's the culture I grew up in. We don't meat at home, so it wasn't that hard to come to college and continue that. I try to be conscious of getting all my protein and nutrients, but that's just a matter of taking a daily vitamin pill. I guess it never occurred to me that I wanted to eat meat. I'm sure that it's appetizing to some people, but it's sort of like asparagus to me. I don't really care that much for it, and I've never had it before, so I don't eat it.

~ Nishita Jain, LSA freshman

In Their Words

I was vegetarian in high school because I knew it was more environmentally sustainable. But when I came to college, I became more involved in Michigan Animal Rights Society (MARS) and started looking into the more environmental reasons to be vegetarian. As far as animal rights go, I feel that animals have very similar physiology to humans. They have nervous systems, they feel pain, and that should be reason enough to afford them the right to be treated humanely. These creatures are treated very poorly on factory farms whose sole purpose is to churn out edible meat. Environmentally speaking, animal agriculture leads to excessive amounts of pollution. First you have to grow crops to feed the cattle, leading to greenhouse gases and ruining the soil, which is exacerbated when deforestation happens to clear land for grazing. There is a very high ratio of pounds of grains used to make one pound of meat, and it's not very efficient. Plus, the waste that the cattle create releases large amounts of methane gas. In 2006, the UN Food and Agriculture Organization did a study that found out that animal agriculture is responsible for 18% of greenhouse gases, which is actually more of an effect than transportation has. When you've got reasons like these, why in the world would you want to contribute to the meat industry?

~ Joseph Varilone, LSA sophomore

I never really felt comfortable eating meat. Because of family pressure, I would sometimes eat locally raised meat, but I gave that up because I felt that a lot of the pressures put on vegetarians sort of made me reluctant to eat any type of meat. I think there is a lot of pressure put on vegetarians by the people around them. My father in particular didn't understand why I didn't want to eat meat. From peers, I've also heard comments that implied being a vegetarian was inferior to being an omnivore. Sometimes they were joking, but it was often clear that they thought it was weird to be vegetarian. In terms of society, there's also a frightening lack of accommodation -- I often felt like I couldn't go out to eat or go to catered events because I would starve. People also felt very entitled to give their opinions about my diet. I called myself a vegetarian because I didn't eat meat 99% of the time...and it was the most convenient label for why I was like that. But people would say things like 'You're not a real vegetarian -- why can't you eat this burger?' It pissed me off to no end, and it was eventually the reason why I stopped eating meat altogether.

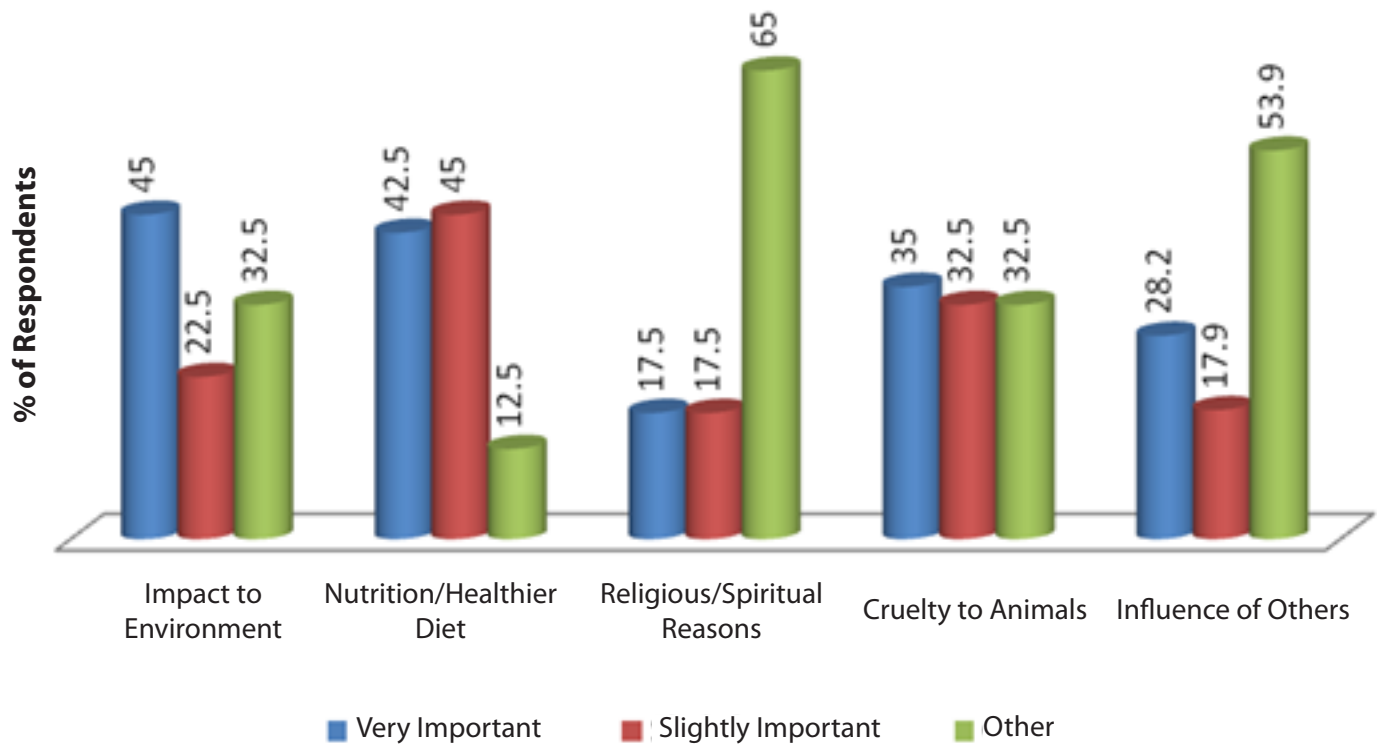
~ Tamara Andrade, LSA sophomore

By Sandhya Simhan

My mom and sister are vegetarian and that really influenced me. My sister is a strong advocate of animal rights, and my mom does it for health reasons. So while I was growing up, it was already part of my daily diet. When I came to college, my roommate was vegetarian, and it became pretty easy to just make the permanent switch. Being vegetarian actually makes you rethink the meat you used to eat. Before, meat was something appetizing; but now, I don't see most meat as appetizing, I see a carcass. Perception changes. So I guess I'm really vegetarian as a mix of family influence, animal rights, and health reasons.

~ Lauren Frisch, LSA freshman

Why Students Choose to Practice Vegetarianism



important to their choice to be vegetarian. One vegetarian even asserted: “There are not too many people that are veggie for environmental reasons alone... If that means I contribute less to environmental damage by that choice, so be it.”⁶ So while many may deem these environmental issues important, the emphasis remains on the fact that a variety of personal reasons result in one’s choice to become a vegetarian.

Ultimately, both vegetarians and non-vegetarians on the Internet comment on the reality of choosing not to eat meat.

⁶ <http://www.vegetarianvitaminsguide.com/vegetarian-health/if-you-choose-to-be-vegan-vegetarian-for-health-or-environment-why-do-you-use-fossil-fuels>

Many bloggers comment on whether or not vegetarians receive enough nutrients from their diet (the answer seems to be “yes”, as long as they make sure to incorporate foods that are sources of particular nutrients that meat-eaters generally access through meat). As one Internet writer notes, however, “the reality is we have to make [the planet] more sustainable for people who don’t want to be vegetarians.”⁷ He admits that while avoiding meat is highly beneficial to the environment, it is important to recognize that many people will refuse to become vegetarians (i.e. respect the need for choice) and that there are ways to make

⁷ <http://www.alternet.org/environment/82628/>

meat eating more sustainable, such as eating less meat and discriminating against certain types of meat – beef in particular. Just as academic researchers suggested, there are ways to continue eating meat and simultaneously protect the environment.

Scholars and bloggers appear to agree: human vegetarianism is a healthy option for the environment. Yet “choice” and “reality” seem to be fundamental factors in this debate. The question that remains is: how can the choice of human diets – both vegetarian and meat-based – be made more sustainable?

Interview: Professor George Estabrook

Colin Yee

George Estabrook is a professor in the Department of Ecology and Evolutionary Biology, focused in plant ecology and systematics. In LSA, he taught Biology 102, 105, and EEB 480. He is currently on sabbatical in Portugal studying traditional farming methods.

Tell us about your sabbatical leave and what your research entails.

I'm in Portugal where I study traditional Portuguese agriculture using modern scientific technology. So I try to understand how the techniques of traditional Portuguese agriculture have worked to sustain, over the past 800 years or so, the agricultural productivity of the farmland here. The loss or destruction by chemical fertilizers and pesticides in the USA is... impressive, and I'm particularly interested in soil as an essential natural resource that renews very slowly. So my concentration here in Portugal is what do the traditional peasant farmers do to maintain the fertility of their soil. And that involves the use of plant material that contains nutrients in its organic material, especially plant material that collects these organic nutrients from the atmosphere or deeper down in the rock. They also maintain farm animals whose manure contributes effectively to the maintenance of soil fertility.

So, do you learn about the traditional techniques and implement other techniques to



try to make their farming more efficient?

No, I study their traditional methods; I don't try to teach them anything. I try to learn from them what it is that they do that seems to have worked for the past many hundreds of years. And then I use modern ecological technology to try to understand why it works and how it works and to measure quantitatively the nutrients that are present in the plant and animal matter and in the crops that they produce and the soil that they manage and so on.

I'm not trying to help them at all. The purpose of this research is to learn from them what it is they do so that we, who are in many cases not getting it very right as we trash our soils and pollute our crops, cover our farmland with other less appropriate structures; help us understand how this has been done in the past. I'm not there helping farmers at all. I'm there learning from farmers how they've managed to pull this off for the last 800 years.

So have you learned a lot from these traditional farmers?

I've learned the importance of maintaining what looks like non-plowed farmland where wild plants grow and the wild plants are able to bring nitrogen fertilizer out of the atmosphere and they're able to pull up other nutrients from deep in the rock. And then the wild plants are cut by the farmers and buried in the soil to maintain the soil's fertility. So by keeping maybe ten meters of wild plant for every meter that's actually cultivated and plowed, the system maintains itself sustainably; indefinitely.

What are your opinions on vegetarianism and veganism?

Well, I think vegetarianism and veganism is a choice that people can make and, with the exception of very few nutrients, vegetarianism and veganism can get very good access to nutrition. Certainly, plant seeds have plenty of protein. Lentils, for example, are about 25% dry weight protein and if you eat a wide variety of plant seeds, you're certainly going to get adequate protein and well-balanced protein. So there's no protein issue around being a vegetarian or a vegan. Most of our vitamins and minerals come from plant sources. There are only a couple of vitamins and minerals that are supplied to us better by animals, and only one, vitamin B12, is the only vitamin that you absolutely need to get from animal sources. Iron is much more available from animal sources and many folks in the United States and around the world are deficient in iron. Some plants, especially cabbage family plants, have available iron and if

you're willing to eat a whole lot of them, you can get something approximating iron without eating animals.

Many people believe that if they switch to vegetarianism or veganism, they will be helping the environment. Are they correct in believing this?

I think, in respect to the environment, the change is pretty minute. In my view, the real problem with raising animals has been the recent trend toward producing more

animals in what we commonly call factory farms. In order for these factory farms to function effectively, the animals generally need to be treated with antibiotics to keep diseases from spreading among them because they are maintained so close together. And often the facilities are treated with other chemicals to prevent problems in fire or other diseases. Also, such concentrated facilities tend to produce enormous quantities of animal waste, which is not always disposed of in the most appropriate way. So, if animals are raised where they can run

around as natural animals and if animals can eat grass and other foods that people don't eat themselves, using and consuming these animals both for food and for other contribution they make to mixed agriculture probably doesn't very severely negatively impact the environment, in my opinion.

Read more at umurj.org!

Don't know why analyzing mercury levels in fish or running tests on psychology study participants is important? Here are some thoughts on research from two notable University of Michigan faculty: Dr. Steven Gay, Assistant Dean of Admissions of the U of M medical school, and Dr. Kathleen Nolta, widely-known and respected chemistry lecturer.



"If you feel a passion for research, it's important to follow that passion...and to participate [in it] actively."

"There are very unique aspects of research that you can't learn anywhere else...a positive result may take an exceptionally long time to develop and...you may have to go through a number of pitfalls, changes in research protocols, and approaches to get to that point."

"An important part of research is...[learning what it's like to succeed or fail]."

"[Research] lets you know if you experience the joy, happiness, and interest of working in science."

"Research will always be essential, always be needed, and always be fun."

"Pharmacological research will be big for the next century. As soon as that door is opened, drug design will make everybody's life better forever."

"A big inefficiency [of research] is getting money...the more research money dries up, more people will go into research with the mind of competition."

"To maximize the usefulness of research, you need collaboration."

"The key to everything scientific is time management."



How to Get Involved In Research

Types

- Sciences
 - Chemical, Medical, Psychological
- Engineering
 - Material Science, Civil Electrical
- Humanities
 - History, Languages
- Social Sciences
 - Economics, Political

To Get Started

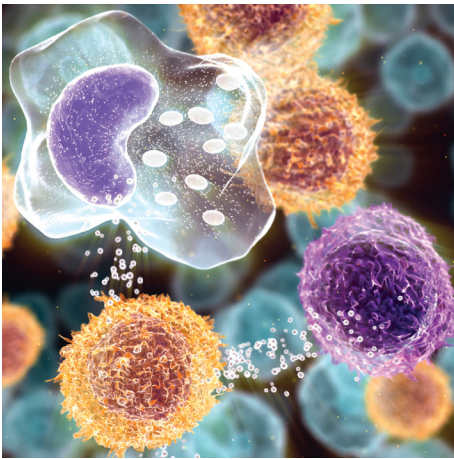
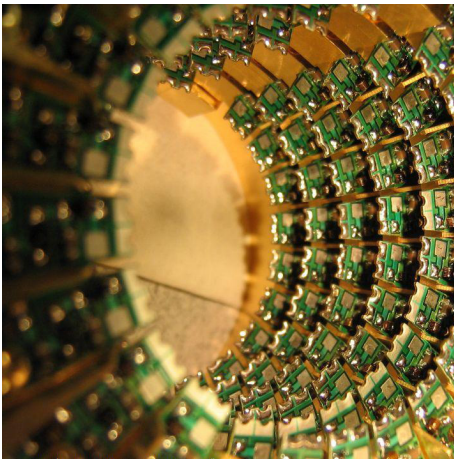
- Ask your professors about their exciting research
- Search department websites for PI's in your field of interest
- Search the Student Employment Website
- Join or visit the UROP office to streamline the whole process
- Steps for getting an interview:
 - Identify a research project
 - Due diligence: background research and network
 - Send email cover letter and attach a resume

Benefits of Research

- Contributes to the advancement of human knowledge
- Builds a unique set of hard skills and hands on experience
- Helps identify your academic and career interests
- Prepares you for graduate opportunities
- Provides a steady income or academic credit

Looking Ahead

- Summer Opportunities
 - Summer Research Opportunity Program (SROP)
 - Research Experience for Undergraduates (REU)
 - Social Sciences & Humanities Summer Fellowship Programs
 - Summer Biomedical and Life Sciences
 - Professors seek research assistants year round



Go to umurj.org for more content, including:

- *Full interviews with:*
 - *Dean of Admissions for the UM Medical School*
 - *Dean of Public Health*
 - *Prof. Kathleen Nolta (Chemistry)*
 - *Prof. David Aronoff (Dept of Internal Medicine)*
- *Full “Vegetarianism and the Environment” article*
- *More info on “How to Get Involved with Research”*
- *Past issues of the UM Undergraduate Research Journal*
- *And much more!*

Interested?

Consider submitting your original research for publication in the annual Undergraduate Research Journal!

Or, apply for next year’s Editorial Board!

Sponsored by:

Office of the Vice-President
for Research (OVPR)

&



University of Michigan Undergraduate Research Journal - The Zine

umurj.org / forumeditorial@umich.edu