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PERSPECTIVE

COME DINE WITH
MICROBES: WHERE
MICROBIOLOGY,
FOOD, AND CULTURE
MEET COMMUNITY
OUTREACH
AND STUDENT
ENGAGEMENT



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INTRODUCTION

Thompson Rivers University (TRU) is located in the interior of the province of British Columbia in Canada. At TRU, we offer a cellular, molecular and microbial biology (CMMB) program alongside other biology programs. Students can select a three-credit elective upper level course, BIOL 4490, entitled “Selected Topics in Biology” which features an advanced seminar in a topic of interest. One of the BIOL 4490 courses was on Microbial Applications in Industry (Industrial Microbiology) for the 2014 winter semester and it highlighted the unlimited biochemical capabilities of microorganisms as well as a great variety of microbial fermented products. Principles of fermentation technology were introduced and various factors that have a great impact on the biochemical and physiological basis of industrial fermentation processes were discussed. Different fermented products and the microbes associated with their production were chosen and the students investigated them as case studies.

The general learning objectives of this course were to:

1. Recognize the role of microorganisms in industrial microbiology.
2. Understand the range of fermentation processes available for different products and the practical benefits and limitations of them.
3. Develop an awareness of the importance of microorganisms in industrial processes.
4. Learn the biochemical strategies used by microorganisms to produce metabolites that we can use to our benefit.
5. Explore the versatility of microorganisms, their diverse metabolic activities and their products.
6. Learn about industrial microorganisms and the technology required for large scale cultivation and isolation of fermentation products.
7. Learn to read and critically evaluate scientific literature.

With the intention of enhancing student engagement and community outreach with topics taught in class, the “Come Dine With Microbes” project was introduced. I was

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Table 1. Student Evaluation for the BIOL 4490 Microbial Applications in Industry

Prior to 2014 Winter Semester	Winter 2014 Semester
In-class participation (10%)	In-class participation (10%)
Field trip report (10%)	Field trip report (10%)
Field trip participation (10%)	Field trip participation (10%)
Term paper (20%)	Individual presentation (10%)
Individual presentation (10%)	Group presentation (10%)
Group presentation (10%)	Come Dine With Microbes (50%)
Final exam (30%)	

inspired by a laboratory menu passed on to me years ago by a retired faculty member, Carolynne Fardy (Fig. 1). When I saw the menu again prior to the semester, I had a spark and I thought I should ask the class whether they were open to the unorthodox idea of putting on a dinner/fundraiser based on microbial fermented products instead of writing a final exam and a term paper for the 50% of the marks (Table 1). With this dinner, we, as microbiologists, could also help raise public awareness of the fact that not all bacteria are bad (fewer than one per cent of all bacteria cause human illness). The majority of microbes are good or neutral to us and in fact we cannot live without them. By introducing this initiative, I hoped that the experience would engage student learning and that at the completion of this event the students would be able to discuss the role of microorganisms in industrial microbiology and the range of fermentation processes available to produce different products with their practical benefits and limitations. I wanted the TRU students to communicate their knowledge at a layman's level by interacting with the NorKam Secondary School students and dinner guests. Furthermore, I hoped that they would communicate to this wider audience the importance of microorganisms in our daily life, the versatility of microorganisms, and their diverse metabolic activities resulting in products for our society. The dinner had the added benefit of intercultural learning through sampling different ethnic fermented

foods. I would like to think that I am a part of creating the next generation of global minded scientists; one small class at a time!

In September 2014, we had discussed this idea with a local school, "NorKam Secondary School", and their Culinary Arts, Foods and Home Economics Program. The instructors, Chefs Scott Roberts and Jo-Anna Allen

agreed to help us put on the event on April 11, 2014. In collaboration, we were asked to dedicate two class-times prior to the dinner to go to the secondary school classes and demonstrate to the high school students the impact of microorganisms on food safety so the students can appreciate hand washing and no-touching-face/hair-during-cooking policy.

Once decided, we used some of our own class times to organize the event. Students designed and chose the menu (Fig. 2). We worked together to locate sponsors for the event. Once the tickets were ready (Fig. 3), we had them sold in a very short amount of time. We also met with Chefs Roberts and Allen a few times to go through

aspects of getting the kitchen and materials ready for the dinner. Our TRU students were the main kitchen workforce with the NorKam students helping. Communications were maintained through email messages. Prior to the dinner, the TRU students spent two class-times talking to and introducing the NorKam students to the wonderful world of microbes with special emphasis on the relationships of microbes with food and food

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Fig. 1. The menu passed on to the author that sparked the initiative (Source: Unknown)

Menu à la Laboratoire

Soup

Miso (soybeans arranged by *Aspergillus* and *Saccharomyces*)

Salad

Olives prepared by *Leuconostoc*
fleshy fungi (*Agaricus*) grown on thoroughbred manure
and seasoned by *Acetobacter* (vinegar)

Entrées

S. cerevisiae and (by request) *Lactobacillus* will prepare
rye, pumpernickel, and sourdough

Single-Cell Protein

A delightful casserole of sewage-fed cyanobacteria. Flavored with poi
(lactic-acid bacteria work their magic on taro root)

Fettucine Torula

Spicy noodles "proteinized" by
Torulopsis yeast

Beef Bonanza

Tender slices of *Methylophilus*-fed beef marinated in soy sauce
(produced by a symphony of microbes)

Carne Macha

An assortment of sausages from
Pediococcus and *Penicillium italicum*

Vegetables

Cabbage fermented to pH 3.5 by *L. plantarum*

Dessert

* *S. thermophilus* and *L. "Bul" garicus* will culture milk
Chef *Leu CoNostoc* will smother it in dextran, an α -1,6-glucose polymer

* Assorted cheeses
Streptococcus and *Lactobacillus*, assisted by *P. roquefortii* and *P. camemberti*

Drinks

Alcohol served by the sweet
fungus *Saccharomyces*

Beer

Wine

Nonalcoholic beverages
Lactobacillus' buttermilk
Saccharomyces' root beer
Erwinia's coffee

safety (Fig. 4). TRU students were marked on their presentations and interactions with the NorKam students. We spent a few hours of the day before the event purchasing ingredients and putting them in the NorKam kitchen (Fig. 5). The actual day of the event, all of us arrived at NorKam early to prepare the foods and the venue. We had a number of volunteers to help us as well.

At the dinner, we arranged a non-traditional buffet style by having food stations (for each chosen fermented food) and having TRU microbiology students and NorKam students man each station (Fig. 5). This facilitated communication with the guests when they came up to sample various foods. We successfully hosted 80 guests (approximately 100 people in total, including students and volunteers). Guests were very happy to taste delicious and healthy foods while learning about the production of microbially fermented foods through posters (Fig. 6) and communication with students. Some were pleased to win our raffle baskets filled with different fermented products donated and sponsored by local merchants (Fig. 5). A number of guests expressed how much fun it was and that they would like to see more events such as this. At the end, we raised \$1,000 that was split between NorKam and TRU Microbiology teaching and research activity.

All in all, I think that we achieved what we set out to do given the success of the event. TRU students were engaged and showed their learning by teaching the high school students and dinner guests about the role of microbes in production of the various foods that were served. High school students and teachers responded enthusiastically to the microbiology exercises they performed and the food that they helped to prepare. Dinner

guests were equally enthusiastic about the meal and the information provided by the students. The TRU students did very well explaining the role of microorganisms in industrial processes and food production in language that was easily understood by high school students and members of the public at the dinner. The students also demonstrated communication skills through posters (Fig. 6), brochures (Fig. 7), as well as informal verbal presentations at the dinner. They conveyed to a wide audience the importance of microorganisms in our daily life, the versatility of microorganisms, and their diverse metabolic activities resulting in products that can be used in our society.

On February 12, 2014 I was very happy to see an article entitled “Chefs and Microbiologists Break Bread Anew” published in the ASM-Microbes volume 9 (1) pp.13-17 (http://www.microbemagazine.org/index.php?option=com_content&view=article&id=6567:chefs-and-microbiologists-break-bread-anew&catid=1295&Itemid=1565). What perfect timing for our class project! My idea was not that far-fetched after all and I was glad that my students were on board and were much more enthusiastic than any class I ever seen before. Throughout the course, I found continuous enthusiasm and positive learning energy from my students even though they had to work harder than previous classes preparing for the dinner. This showed how engaged the students were through planning and executing the event. In my 13 years of teaching at TRU, I have never felt such a high level of ownership and pride demonstrated by students.

COMMENTS AND IMPRESSIONS FROM STUDENTS AND DINNER GUESTS

Comment #1: “As for my experience, Come Dine With Microbes was the most rewarding project of my undergrad as it provided me with an opportunity to participate in a community outreach project and to network with the public, something our faculty does not emphasize. I not only valued the opportunity to be creative and learn the ropes of hosting a public event, but I also enjoyed that the theme we created which allowed us to educate the public on a scientific topic through the universal language of food! Having the opportunity to connect with the public provided me with an opportunity to learn how to communicate microbiology in the “real world” and in a way that left a lasting impression on the students we lectured at NorKam, as well as the gracious guests that attended our event!”

Comment #2: “I would say that overall the dinner was a success for the entire class as well as the community at large. Planning for this dinner allowed my classmates and I to discover just how many uses microbes actually have in the industrial world and in the culinary arts (I had no idea that chocolate is the result of fermentation). Furthermore, the presentations that we gave to the students at NorKam Secondary as well as the guests at the dinner allowed us to pass on what we had learned to the community. In the end, I think that the class as well as our audience members understood that most microbes are not bad; many are beneficial and necessary for the little luxuries we often take for granted. I had a great time in this course and would recommend that a similar approach is repeated for future classes.”

Comment #3: “This class introduced me to the potential health benefits and industrial applications of microorganisms by giving

me hands-on real life experience.”

Comment #4: “This started out as a fun way to spread the word about the importance of microbial fermented food in a healthy diet, and ended up being an incredible learning experience. Not only did we discover fermented food products from all over the world and get to make several of them ourselves, we learned how to plan, organize, and carry out a fundraising event! Because this was our event and our food, everyone wanted to see it a success and I have never known an entire class to collectively put that much effort into an assignment before!”

Comment #5: “Come Dine With Microbes was an educational and fun event with lots of good food! The students did a fantastic job of presenting and serving the food. I thoroughly enjoyed meeting new people and old acquaintances as well.”

Comment #6: “My spouse and I attended the “Come Dine With Microbes” event in April 2014. Dr. Cheepthams’ passion and desire to promote microbiology concepts applicable to daily life events (i.e. food) was most evident in the enthusiasm and energy her students exhibited throughout the evening. Each menu item was delicious and accompanied by a narrative with regard to the microbes utilized in the dish. The event was well organized and educational. In my value judgment, a meaningful dining and learning experience was had by all participants.”

Comment #7: “I found ‘Dinner with the Microbes’ to be such a unique and creative learning experience for me and my children (age 4 and 7), in addition to the students who worked so hard to bring it to fruition. I was not sure what to expect with respect to a dining experience, but was intrigued by the concept and believed in the educational merit. To my surprise the food was amazing and my children and I learned a great deal

Fig. 2. The menu that students selected to represent at our dinner

Come Dine With Microbes Menu

Starter

Kimchi Crostini

Soup

Miso Soup

Salad

Pickled Root Vegetable Salad

Entrees

Tempeh Sliders

Sausage and Sauerkraut

Dessert

Chocolate Dipped Fruits

Nonalcoholic Beverages

Ginger Beer

Tea

Coffee

Fig. 3. The ticket for the event

Come Dine With Microbes

Community Outreach and Student Engagement Project
 Place: NorKam Secondary School's Cafeteria
 730 12th Street, Kamloops, B.C
 Date: April 11, 2014
 Time: 6 - 9 PM

Full dinner:

- Tempeh Sliders
- Kimchi Crostini
- Miso Soup
- Cheeses, sausages and lots more!

NorKam Secondary School and TRU BIOL
4490 Microbial Applications in Industry Class (W14)

Tickets
\$15 cash

- Raffle prizes
- Try microbially fermented food
- Learn about the benefits of bacteria
- Fundraiser for microbiology research at TRU
- Come get cultured or at least fermented!

SPONSORS



Fig. 4. TRU student presentation on the wonderful world of microbes to NorKam's Culinary Arts, Foods and Home Economics Program students prior to the dinner event: a) Class presentation; b) Demonstration of bacteria cultured on the plates from swabs that NorKam students did; c) Chef Scott Roberts and the NorKam students interacted with the TRU students; d) Glow Germ hand washing exercise.

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about microorganisms in a way that was engaging and memorable. It was evident that the students who participated in this event were inspired by the innovative teaching techniques offered through this event. I would not hesitate to attend such a function again in the future and could see an event like this growing with time as it was received so well by those who attended."

Comment #8: "My wife, 7 year old daughter, and I all attended the "Come Dine with Microbes" dinner at NorKam secondary. This event was really enjoyable. First, as we walked through the food buffet,

we enjoyed talking with both the TRU microbiology students and the NorKam science students about how the food served were representative of different microbial and fermentation processes. It was clear the students were enthusiastic about sharing their scientific knowledge in this practical way. Moreover, it was a very interesting experience for my family to gain a greater appreciation for the different production processes of the food at the different buffet stations! Also, while sitting and eating my family and I also enjoyed talking with other guests and students. Everyone at the event agreed how we had gained a greater

“ THIS DINNER WAS A GREAT ‘AWARENESS TOOL’ THAT SHOWED THE PUBLIC THAT NOT ALL BACTERIA ARE HARMFUL AND HAVING A REGULAR INFLOW OF NEW MICROBES INTO OUR SYSTEMS CAN ACTUALLY BE BENEFICIAL AND HEALTHY. ”

appreciation, and understanding of our food through this event. I really believe events like this contribute to increasing our awareness and knowledge of scientific areas such as microbiology.”

Comment #9: “I was intrigued when I heard there were tickets being sold for “Come Dine With Microbes” so decided to attend. I found the whole experience very delicious and interesting. The students did a wonderful job of presenting the dishes and were ready to answer our questions on the food and the microbes that created them.”

Comment #10: “Come Dine with Microbes was a wonderful, unique and engaging way to bring a more positive perspective to the community about the often hidden value of microbes in our lives. My husband and I thoroughly enjoyed the microbial based foods prepared by the enthusiastic students and came away with a better understanding of the health benefits of fermented foods.”

Comment #11: “The Dining with Microbes Dinner was an amazing opportunity to show just how essential microbes are to life. As students we were able to present a delicious array of food that was possible due to the actions of microorganisms. I think everyone at the dinner had a great time eating the food, winning various prizes all while being educated about the many jobs of microorganisms. The dinner was a great success and I believe our class and the participants had a blast!”

Comment #12: “I was thrilled with the dinner with microbes’ event last year. It was really beyond my expectations for everything. The students had done a great job providing interesting information about their particular food and they presented it well. The food was delicious, well-prepared and the tempeh sliders were my favorite! I will not hesitate to attend another event such as this.”

Comment #13: “The event was one of the most interesting things that I have done at TRU. It really encouraged me to work well with my fellow students in a way that a regular structured class does not provide. I helped out mostly with decorating the hall, design of posters, media things such as music and the tending to the miso soup station. Throughout the entire process I feel like I got to know my instructor and fellow classmates on a more intimate level. Many times classes have you sitting and staring at a projector screen trying to absorb somewhat boring words or material. This class and the dinner event focused on the community aspects more, which is something that I really enjoy. The dinner also engaged the public into a world of microbes that maybe they were never aware of existed in these foods. Some of the dishes also provided the public and students with a greater idea of how to make/prepare and enjoy these foods in our own home. This dinner was a great ‘awareness tool’ that showed the public that not all bacteria are harmful and having a regular inflow of new microbes into our systems can actually

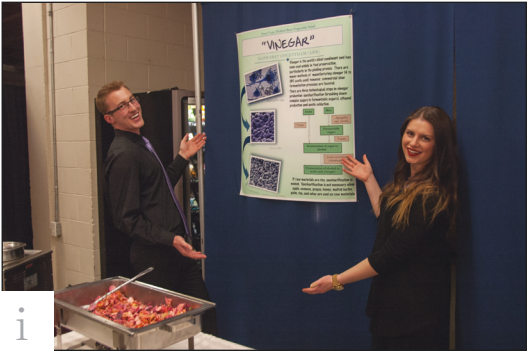




Fig. 5. April 11, 2014 the event: a) Both TRU and NorKam students were briefed by Chef Scott Roberts; b to g) Students were having fun on food preparation and setting up the venue; j) Raffle ticket drawing and announcement; k) The team; l to o) Our happy dinner guests with their raffle baskets; p) Cleaning crew!

be beneficial and healthy. Overall, it was an awesome experience and it taught me a lot about microbes and how they interact with our foods.”

Comment #14: “I think there is a lot of unfortunate misinformation about microbes

spread by the media. At the very least, the focus is kept on the negative aspects of pathogenic bacteria, which obviously represents only a small portion of the known microorganisms and are actually exceptionally rare considering how many we encounter on a daily (or even hourly)

basis. I understand why these negative aspects are considered more “newsworthy” — a story about contaminated food killing two people in Toronto is more shocking than a species of bacteria living in our digestive tracts helping us to break down our food and preventing illness. However, I think if the mainstream media isn’t going to promote these ideas then somebody should. I know far too many people who constantly disinfect everything they may touch and can’t go an hour without using hand sanitizer. These actions represent someone terrified of “bugs” and “germs” because they see them as purely negative, able to infect you at any moment and cause life-threatening illnesses! Of course, we know that this isn’t the case and we understand that having communities of microbes inside your body is a requirement of a healthy individual, but I can understand why the average person gets frightened. Caution is completely fine (nobody wants food poisoning!) but I think people take it to a new level. That’s why I think projects like ours are important. Everyone knows yogurt is made using microbes but many don’t realize the other food products we gain or the importance of microbes in the process. After the dinner was held, my aunt (an attendee) made one of the dishes we served for Easter dinner and spread the word about the fermentation process to the rest of my family because she thought it was interesting. I think the dinner is a good format to spread the word because

(if it’s successful) it’s something that people remember easily because they had fun and learned some new information! The same can be said for my own personal engagement. I will always remember it because I had fun and learned new information. I had no idea most of the foods we served were fermented. It was a very memorable learning opportunity! As for how I think we could make it better

in the future... (if you do decide to do this with your classes in the future). I think everything worked out in the end which is awesome, but the process of organizing the dinner could also probably be streamlined. I think it would be more beneficial if, instead of people taking on certain individual jobs, if we had people (or small groups of people, 1-3) taking on general roles instead: Decorations (table cloths, table placement, centerpieces, screens/ screen placement, music); Signage (posters, pamphlets, advertising); Tickets (designing them, coordinating the selling of them, ideas for selling outside the university); Food (getting donations,

figuring out amounts for the final dinner (scaling up recipes), being in charge of menus); Raffle/Donations (getting donations, putting together the raffle baskets, coordinating sponsor logos for the tickets/ pamphlet); Secretary (going to all the NorKam meetings & taking notes, taking notes at in-class discussions, sharing the notes with the class, making a game plan for how everything will go during dinner

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Fig. 6. Examples of posters describing microorganisms and fermentation processes involved in the food served.

Food Type:

"MISO SOUP"

DEWALD VAN DER MERWE AND RUPERT HEYES





What is Miso Soup?

The pastes can be sorted into red (akamiso), white (shiro-miso), or mixed (awase). Miso Soup is traditionally a Japanese Soup and is an extremely high source of omega-3 and omega-6 fatty acids (Nutrition Data listing for miso)

The Fermentation Process

The *Aspergillus oryzae* fungus ferments soy beans to make the miso paste. Fermentation time can be anywhere from five days to several years. Various ingredients can be added for desired tastes.

How to Make Miso Soup!

#1. Heat the Dashi in a Pot with water. #2. Soak the Wakame (seaweed) with water so it expands. #3. Melt Miso paste using warm dashi mix (stir well). #4. Add cut tofu to heated Dashi and Miso. #5 Add Wakame to mix (do not boil). #6. Serve

Food Type:

"KIMCHI"

JASMEEN DHALIWAL & LAURA SMYLIE





Kimchi is a staple in Korean cuisine, made from fermented cabbage, spices, herbs and other vegetables. The process of making kimchi is relatively simple, beginning with gathering up the ingredients you wish to ferment and the bacteria needed to carry out the process.

Vegetables are soaked in brine containing several bacteria species, such as lactic acid bacteria essential for proper fermentation and flavour development. Other microbes include aerobic species *Streptococcus faecalis* and *Leuconostoc mesenteroides*, *Pediococcus pentosaceus* and anaerobic species *Lactobacillus plantarum* and *Lactobacillus brevis*.

Kimchi is safe to consume anytime once fermentation has commenced. It has a long shelf life, but can ferment to the point of alcohol formation if left in the refrigerator too long. In most cases, Kimchi is too good to resist and is gone long before the point of spoilage. Enjoy!

Food Type:

"CHOCOLATE"

MERCY RUNGI AND QUINTON SIRIANNI





Chocolate is derived from the cocoa bean, which grows in pods on the cocoa tree (*Theobroma cacao*) in tropical climates. Each pod contains around 40 beans. Ripe pods are harvested, split open, and the beans removed. The beans are naturally fermented for 5-7 days by a combination of *Saccharomyces cerevisiae* (brewer's yeast), *Lactobacillus* sp., and *Acetobacter* sp. This process develops the flavour.

The beans are cleaned, roasted, and shelled once fermentation is completed. They are then ground and liquefied. The liquid is separated into cocoa powder and cocoa butter.

Food Type:

"TEMPEH"

KAYLA HOLTSLAG & JILLIAN LANE





First, soy beans are cracked and soaked in water overnight. The beans are then separated from the hulls, boiled, strained and dried.

The soy beans are sprinkled with the tempeh starter, which contains the fungus *Rhizopus oligosporus*, mixed and distributed into perforated plastic bags.

The beans are then stored in a warm (28-32°C), humid environment for one or two days, until they are covered in white mycelium. Now you have tempeh!

Fig. 7. Examples of student-generated brochures

What's on the Menu?

Starter Kimchi Crostinis
Fresh bread made from *Saccharomyces cerevisiae* topped with pear, creamy *Lactobacillus lacti* cheese and spicy Kimchi.

Steaming Miso Soup
A comforting bowl of soup flavoured with miso fermented by *Aspergillus oryzae* and finished off with cubed tofu and sliced scallions.

Pickled Root Vegetable Salad
An assorted variety of pickled garden vegetables topped with delicious apple cider vinaigrette made by *Aspergillus* sp. and lactic acid bacteria.

Savoury Sausage & Sauerkraut
Sliced sausage topped with tangy sauerkraut fermented by *Lactobacillus* sp. and your choice of sour cream or mustard.

Juicy Tempeh Sliders
Delicious tempeh made from the fermentation of soybeans by *Rhizopus oryzae* sandwiched between an assortment of vegetables and soft slider buns.

Decadent Chocolate Dipped Fruit
Succulent fruit dipped in mouth-watering chocolate fermented with the help of *Saccharomyces cerevisiae*, *Lactobacillus* sp. and *Acetobacter* sp.



Please help yourself to cold beverages and hot coffee or tea

Health Benefits of Fermented Foods

Fermented foods are rich in enzymes, which help speed up digestion and proper absorption in our intestinal tract, leading to better vitamin and nutrient absorption.

They are rich in good bacteria that can restore and balance the flora in our gut boosting resistance to colds, flus, and infection.

An added bonus is the long shelf life of fermented foods free of harmful preservatives, so you can enjoy your food longer without spoilage!

Thank you to our generous sponsors & volunteers



Tonight was brought to you by the staff and students of NorKam Secondary Culinary Arts Foods & Home Economics Program

The students of TRU BIOL 4490 Winter 2014:

Arjun Randhawa, Cohord Mason, Dewald Van Der Merwe, Jasmeen Dhaliwal, Jillian Lane, Jordan Robinson, Kayla Holtslag, Laura Smylic, Mercy Rungi, Quinton Sirianni, Rupert Heyes & their outstanding professor Naowarat Cheeptham (Ann).

Special thanks to Dr. Charles Hays for providing the delicious tempeh and to Scott & Jo for all of their help & guidance!



Come Dine With Microbes

A night of microbial fermented cuisine presented by NorKam Secondary School and TRU BIOL 4490 Microbial Applications in Industry class

Thank you very much for joining us tonight!

We hope to leave you with a lasting impression of the wonderful things microorganisms can do.



Don't forget to enter our raffle for a chance to win a "cultured" gift basket of wine, beer, coffee or other treats!



preparation, etc.). Those are six roles and as I assume you generally have approximately 12 people in your class during a semester maybe two people could be assigned to each role? It worked out for us that everyone got all the work done but only because everyone tried really hard and we managed to have a lot of invested people! It may be beneficial to assign roles to make sure everyone does their part in the future. Also, this would reduce the amount of classes you would have to hold to discuss things -- two people would be responsible for one aspect and could then share ideas with the class and move on. On that subject, I think you could also reduce the amount of class time spent discussing the project by having a plan for

each class -- what we want to discuss and have a set amount of time for each topic so we don't run overboard. This would be far easier now that we have a general timeline and some general ideas. I also think we should attempt to sell tickets to people in the community beyond those we know personally. Perhaps setting up a table at the mall? Or putting posters/flyers out around town? Either way I think it would really help the community outreach aspect of it! As a final suggestion, it may be beneficial to try and hold the dinner in the culinary arts building in the future (aka make plans around their schedule) as I think it would reduce a lot of the work and it's a nicer building!

ACKNOWLEDGEMENTS

I would like to personally express my sincere thanks to the open-minded students of the Winter 2014 Microbial Applications in Industry class for allowing me to be innovative in my teaching and for working tirelessly with a fun attitude to put this event together successfully. You guys rock: Jasmeen Dhaliwal, Rupert Heyes, Kayla Holtslag, Jillian Lane, Arjun Randhawa, Jordan Robinson, Mercy Rungi, Quinton Sirianni, Laura Smylie, Dewald Van Der Merwe, and Cohord Mason. Thanks to all the dinner guests who attended and believed in us! This event would have not been made possible without the help of the NorKam Secondary School's Chefs Scott Roberts and Jo-Anna Allen and the Culinary Arts, Foods and Home Economics Program students for letting us use their kitchen and space. We had numerous generous sponsors: Pipe Genie, Cheng Kwong Grocery, Crannog Ale, Nature's Fare Market; The Village Cheese Company, Harper's Trail, The Noble Pig Brewhouse and Restaurant, The Old Town Farm Market, and Spatial Resource Services. Our sincere thanks to Dr. Charles Hays of TRU for his generosity in providing great homemade tempeh to be used in our main dish and for his enthusiasm for tempeh production; it was contagious. Thanks to Brittany van der Merwe, Brian Tong, Solenn Vogel, Kayla Byzick, Christopher Herbert, and Hamza Hasan for your assistance in many capacities to make this event a success. My sincere gratitude also goes towards Drs. Charles Hays, Ken Wagner and Mairi Mackay for their continued support and their assistance in editing this manuscript.