UNIVERSITY OF TORONTO SCARBOROUGH

MAY 2020

DEPT. OF PHYSICAL AND ENVIRONMENTAL SCIENCE

DPES DIGEST

This issue is dedicated to the 2020 graduating class!
p. 03

COVID19: The Student Experience
p. 05

Research Highlights (Kerman lab)
p. 12

EDITORS:

DR. SHADI DALILI

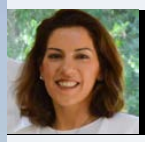
KARYNA HANIF

VITHUSHA COOMARAN

Congrats!

CLASS OF 2020

University of Toronto Convocation Hall
Credits: Melissa Tait



GRADUATION ADDRESS TO THE DPES CLASS OF 2020

Shadi Dalili, Editor

On behalf of the Department of Physical and Environmental Sciences, I would like to express my sincere and heartfelt congratulations to the class of 2020 on this significant milestone and achievement. Your hard work, dedication, perseverance, and passion for learning has brought you to this momentous occasion. Thank you to all the parents, siblings, friends, and other loved ones that have supported and encouraged all our graduates throughout their educational journey.

Although this convocation may not be what you had imagined, I hope you all take comfort in knowing that wherever you are and whatever you do, you are and always will be one of our cherished alumni from one of the best universities (and best campus in my opinion!) in the world.

In these extraordinary times, your education in the sciences is your most valuable asset; at a time when most of the world is shutdown, scientific research labs are working around the clock to find a treatment for this deadly disease. Your scientific expertise and lab skills will be your weapon in defending us from future pandemics and can save the lives and livelihood of millions around the world.

The selfless sacrifice of our healthcare workers and other front line workers during these difficult times has inspired many to join the fight by donating their time, money, and expertise. Many from our campus have rallied to provide essential equipment, such as PPEs, to those in need. If anything, this pandemic has shown us how vulnerable we are as individuals, but how strong we can be as a community.

Thus, I encourage you, in the words of Oprah, to give back what you have been given. "You cannot continue to succeed in the world or have a fulfilling life in the world unless you choose to use your life in service somehow to others and give back what you have been given. That's how you keep it.
That's how you get it. That's how you grow it."

In closing, I wish all of our graduates a future full of health, success, fulfillment, and happiness. We are immensely proud of your accomplishments, and we will miss you dearly. Remember to keep in touch, to visit if you can, and to give back to your alma mater.

Be well and be safe.

Virtual Convocation will take place JUNE 2 at 12 p.m. You can watch the ceremony at www.utoronto.ca/convocation.

Congratulations Class of 2020

PhD Student:
Maryam Abdinejad

Master of Environmental Science (MEnvSc) Students:
Lauren Grzywniak
Kishore Krishna
Emily Posteraro
Lauren Schmuck
Kimberly Stephens

DPES Undergraduate Students

University of Toronto Convocation Hall
Credits: Silver Burtnik and Associates

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Staff: Tom Meulendyk

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Creating 3D architecture
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COVID-19

COPING WITH CHANGE

THE STUDENT EXPERIENCE

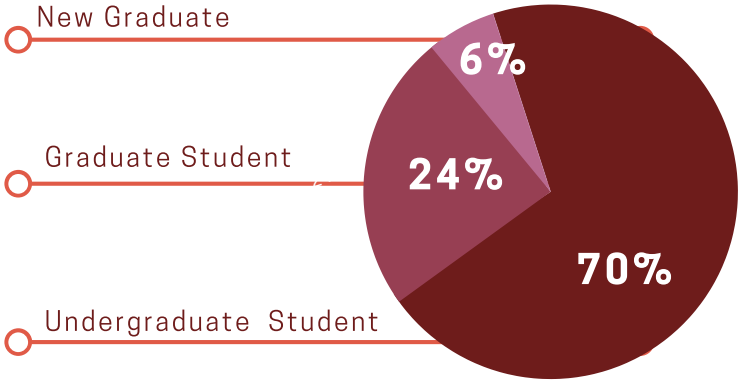
We released a survey to the DPES community to better understand their experience during these unprecedented times. **Here is what we found:**

ABOUT COVID19

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a newly found infectious disease with 6.1M cases reported to date worldwide. This virus spreads primarily through droplets of saliva or nasal discharge from infected patients with symptoms of mild to moderate respiratory illness. There are no current vaccines or treatments available, however many trials are underway. Protect yourself and others from infection by washing your hands frequently and avoid touching your face, and maintain physical distancing.

*3D model: SARS-CoV2

193 PARTICIPANTS:



74% HAVE A HARDER TIME **MAINTAINING FOCUS**
Ranging from worse to much worse

51% STRUGGLE MORE WITH **DEADLINES**

COMPARED PRIOR TO COVID19

7/10

ARE MORE WORRIED ABOUT FUTURE **CAREER PROSPECTS** & HAVE **ELEVATED STRESS** DUE TO CHANGES IMPACTING THEM

3/5

FEEL THEIR USE IN TIME HAS BEEN **UNPRODUCTIVE**

41 % ARE **HAPPY** TO HAVE MORE FREE TIME

1/2 HAVE FOUND WAYS TO KEEP **PRODUCTIVE**

MAJOR/SEVERE IMPACT ON:

EXTRACURRICULAR INVOLVEMENT
FOR **55%** OF STUDENTS

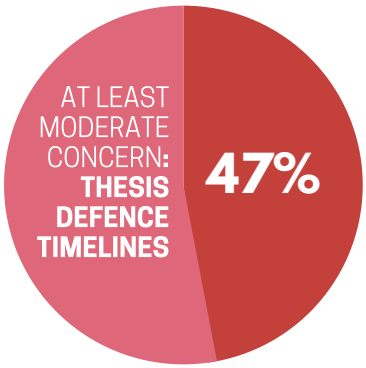
FINDING EMPLOYMENT
FOR **65%** OF STUDENTS

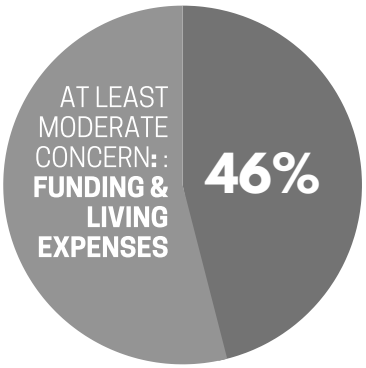
RESEARCH PROJECTS
FOR **44%** OF STUDENTS DOING RESEARCH

NETWORKING WITH FACULTY
FOR **37%** OF STUDENTS

LAB SKILLS DEVELOPMENT
FOR **52%** OF STUDENTS

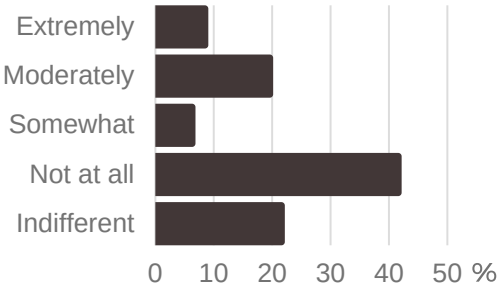
GRADUATE CONCERNS:



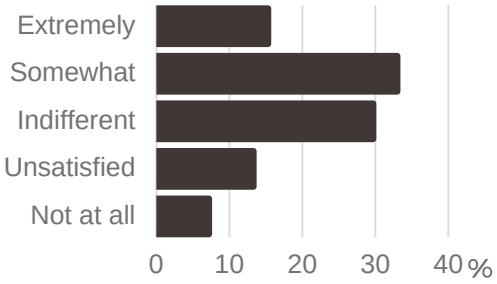


TRANSITION TO AN ONLINE ACADEMIC PLATFORM:

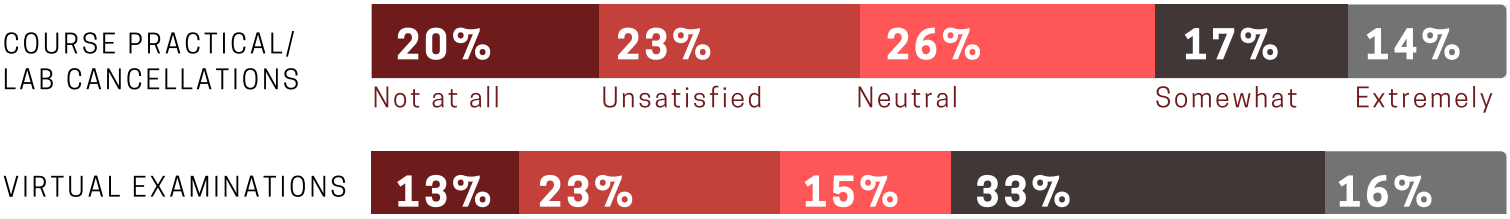
LEVEL OF GRADUATE STUDENT **CONCERN** ON THE TRANSITION TO A **VIRTUAL TA**



LEVEL OF STUDENT **SATISFACTION** WITH **TA SUPPORT** DURING COVID19



SATISFACTION LEVEL:



GREATEST STUDENT CONCERNS DURING THE COVID19 PANDEMIC

SUMMARY OF COVID19 IMPACT SURVEY

Shadi Dalili, Editor

Thank you to all of our students and alumni who participated in our COVID-19 Student Experience Survey. The responses have been very revealing and helpful in assessing the impact of this pandemic on our student population. As the data compiled here reveals, the majority of students are worried about the *effect of online learning on their GPA*, as well as on their *future research, career, and employment prospects*. The cancellation of in-person labs, fieldwork, and research activities was one of the most troubling aspects causing stress among students, as the future success of our graduates from our various disciplines hinges upon acquiring hands-on experience and specific lab skills.

The word clouds represent the major concerns voiced by students in the section asking them to summarize in 3 words their main worries during COVID19. Many could not fit all their worries into 3 words of course, and took the opportunity to freely open up about the anxiety and elevated stress that this new reality has created for them. Thus, *students' mental health* and *stress* is of utmost concern during these times. Their *inability to socialize with friends* and *network for job prospects* are the main factors that have contributed to this mental strain, which we as faculty and mentors need to be vigilant about in order to help students navigate these unprecedented times.

Another issue brought up in the comments was the uncertainty about research courses (such as our CHMD90Y) and students' fears regarding their *inability to gain research experience* and/or *meet program requirements*, ultimately leading to *postponed graduation timelines*. This of course leads to *extra expenses*, such as tuition and living expenses, mentioned numerous instances, as seen in our word cloud. *Online exams* were particularly unpopular as the more diligent and honest students attested it made everyone more susceptible to cheating and sharing answers, which could inflate grades. They voiced frustration that this reflects negatively on all students, even if they did not cheat, when applying to graduate and professional schools.

I think this is the stark and unfortunate reality of online teaching, and with the prospect of fall courses also being conducted remotely, it is imperative that we as educators maintain as much direct contact and interactivity to prevent social isolation, as well as uphold the policies of academic integrity and accountability to the best of our abilities to avoid disillusionment among students.

Call for Graduate Students: Join the GSAS Discord group!

There's a new place for grads to connect online! GSAS has organized a server using Discord, a chat app that supports video calls, screen-sharing, voice chat, and text, so you can get involved in whatever way you like. This is the go-to place for graduate students to gather online at any time and talk, get work done together, or take a break and play some games. All online GSAS events will also be hosted on Discord, with an upcoming group work session on June 2nd at 11:00 AM, to help us stay connected and motivated!

Join here:
https://discord.gg/CwH8ZmK

DPES NEWS AND UPDATES

Congratulations to the Centre for Teaching and Learning (CTL) Grant Recipients!

- *Enhancement Grant Recipients:*
  - i. Kris Kim, Marco Zimmer-Deiuliis, Nirusha Thavarajah
  - ii. Heidi Daxberger
  - iii. Mandy Meriano
- *Equipment Grant Recipients:*
  - i. Adam Martin
  - ii. Hanno Rein
  - iii. Mathew Wells, Maria Dittrich
- *Software Grant Recipients:*
  - i. Tanzina Mohsin
  - ii. Mandy Meriano

FACULTY PROFILE
DR. LATULIPPE

Ph.D. University of Toronto - 2017
M.A. University of Guelph - 2008
B.A. (Hons) Nipissing University - 2006

About Me:

I joined UTSC's departments of Human Geography and Physical and Environmental Sciences in July 2018. My research and teaching center on Indigenous systems of knowledge, governance, and law as they relate to the land and environment. I am motivated by the treaty relationship, practices of coexistence and belonging to place, and Indigenous and critical qualitative research methodologies. I pursue community-based and collaborative research and publish scholarly work, policy reports, and articles for popular media.

Career path, motivations, and goals:

Prior to academia, I worked for the Union of Ontario Indians on the implementation of Ipperwash Inquiry recommendations. This was a transformative experience.

The Ipperwash Inquiry investigated events leading to the 1995 shooting death of Dudley George by the Ontario Provincial Police during an Indigenous land reclamation at Ipperwash Provincial Park. It made recommendations aimed at the avoidance of future incidents of violence in similar circumstances. Working with Elders, Inquiry-commissioned research, community members, and colleagues, my on-the-job education focused on treaty, one of many tools used by Anishinaabeg and other nations to resolve disputes and sustain relations with the earth. The Crown has either ignored or unilaterally interpreted the historic treaties, and Anishinaabeg leadership (other nations, too) continue to advocate for the resolution of treaty grievances and for treaty implementation. But treaty is not limited to historic agreements between Indigenous peoples and the Crown. It is much broader and more powerful. Aaron Mills (2017) writes that treaty is an Indigenous constitutional (legal) framework for shared political community. It is the relationship between communities—not only human, rooted in Creation and preexisting European contact. So, I understand treaty as inclusive, affirmative and active, something that people do to be in right relationship with the land and with each other. The Ipperwash Inquiry was not the first commission to call for treaty implementation, but it was my introduction. The head office of the UOI is located on Nipissing First Nation (Nbisiing territory) and it was here that I would witness how treaty violations are a flashpoint for conflict- particularly around fisheries, which became the subject of my PhD research.

Today, the treaty framework continues to guide my role as a researcher (ethically, methodologically, theoretically, politically, etc.). A few ongoing and current projects include Indigenous environmental justice and water, the First Nation Land Management Act, and the codification of Indigenous laws, as well as urban Indigenous placemaking or placekeeping.

My goals involve teaching, training, mentorship, and using research to contribute to changing narratives about and practices in place.

Recent publication:

Latulippe, N. and N. Klenk. 2020. **Making Room and Moving Over: From Local Knowledge Co-production to Indigenous Knowledge Sovereignty in Addressing Global Environmental Change**. *Current Opinion in Sustainability*, 42: 7-14.

STAFF PROFILE
JENNIFER CARADONNA

Financial & Procurement Administrator,
Dept of Physical and Environmental Sciences
Honours B.A (English and History), University of Toronto (Victoria College)

About Me and My Career:

I had always wanted to pursue my passion for journalism. I studied under some of the most decorated professors at Vic, including Alexandra Johnston and Northrup Frye whose classes fed my passion for the humanities, and who inspired my critical thinking. Then a chance conversation with a recruiter at the university job fair opened my eyes to other opportunities 'outside the box', convincing me that strong communication skills coupled with the theoretical and analytical skills inherent in a university education, were transferable and could offer unlimited business possibilities.

I took a leap of faith, and thus began a demanding and rewarding career with TD Bank operations that spanned over 20 years. As a Business/Systems Analyst, and then Senior Systems Consultant, I was fortunate to be part of a number of business development teams for on-line branch and back office systems. I had the opportunity to analyze business problems and to help design, develop, test and implement the business and system solutions. It was always so rewarding to see a successful implementation and of course, happy end users.

Family priorities had required me to leave my banking career for a number of years. Coincidentally, just when I was considering a return to the business world, a fortuitous encounter with an old friend as well as a Business Officer who was willing to take a chance led me to UTSC and DPES. Forever grateful to Rose and Adriana. It is hard to believe that was back in 2008. The rest, as they say, is history. How the department has changed and grown since then!

Job Responsibilities?

As the Financial & Procurement Administrator, my overall responsibility is to provide financial, purchasing and administrative support for day-to-day financial needs and requests of the department faculty, staff, and students. I am involved with the bi-weekly/monthly payrolls, accounts payable, accounts receivable, the purchasing of supplies and equipment, as well as mentoring, consulting, analysis and issue resolution, as required, for any of the above.

Most rewarding aspects of your job?

It is the people I work with every day who inspire me. I love their energy, their passion, their commitment and dedication to students - and to teaching and research excellence. I never tire of hearing about a faculty member's amazing research or chatting with the students who are full of dreams and aspirations. I respect our incredible administrative and technical team that work together, support each other, celebrate together and share laughs along the way.

Recent accomplishments?

- Volunteer of the Year (x2)
  Durham District School Board
- 1st recipient of the DPES Staff Award

A piece of advice you can share?

Life is a journey. The path is not a straight line. It weaves and crosses people and places. Volunteer where you can. Network as much as you can. Every step you take, every decision you make, every person you meet along the way is part of that journey, influences you in some way and brings you to where you are today.

Challenges in your job?

Managing multiple and competing requests, the volumes of paper-based transactions while ensuring we meet the strict Financial, Human Resources and research grant agency deadlines; Staying current with changes in the university's policies and procedures and collective agreements. These together can provide challenges but also opportunities for learning and growth.

Something the department doesn't know about you?

Always loved music, and played clarinet in bands and orchestras throughout my early school years. Was a founding member of one of Toronto's community concert bands, participated in many local and regional music competitions as well as travelled throughout the province playing for social and cultural events.

STAFF PROFILE
TOM MEULENDYK

Teaching Laboratory Technician (Environmental Science Stream)
Dept of Physical and Environmental Sciences

About Me:

I completed my undergrad at UTSC in geoscience and anthropology before moving to Alberta where I got my masters in geophysics. While in Calgary I also worked for the Geological Survey of Canada for a couple of years. I eventually moved back to Ontario and began working for the department in the summer of 2012.

What are your responsibilities and requirements of your job?

When I first started working as a technician my main responsibilities were to prepare lab materials, catalogue our collections, maintain equipment and generally keep the environmental teaching labs in order but since then my position has evolved significantly.

These days I am more involved in instruction both in the lab and field. I work with faculty to create new labs and teaching materials, often using cool gadgets like our 3D printer and drone. We've digitized some of our lab material as video demonstrations and online modules which has required me to learn a lot about videography and editing. I'm also responsible for creating promotional material for the department (videos, print and digital ads) and managing our social media accounts.

Most rewarding aspects of your job?

One of the more rewarding aspects of my job has to be working with students throughout their time at UTSC. From meeting them as timid first-years in our Intro to Environmental Science labs, to seeing them develop into young scientists in our upper-year labs and field courses. A few then enroll in our MEnvSc program and I get to work with them as TAs before they begin their own careers in environmental science.

Where do you hope your career takes you in 10 years?

I enjoy working with DPES so much that it's hard picturing myself doing anything else. With our courses moving online for the upcoming semester, the need for high-quality, virtual course material is greater than ever. I hope to increase my contributions to this type of learning, possibly developing virtual field trips and

field camps, to make them accessible to a larger audience, with advances in VR and other technologies. I don't think it's possible to replace field-based teaching because that practice is paramount in environmental science, but engaging online content can definitely complement the experience.

What are/were your biggest milestones?

Working with so many talented faculty and staff I get to be involved with a lot of successful projects. However, one ongoing project that I'm most proud of is the reestablishment of the UTSC Weather Station that Chai Chen and I have undertaken. I had to learn a lot about electronics, programming, server maintenance, database management and, of course, meteorological monitoring. As a result of our work, UTSC has a continuous record of weather on campus for the last seven years that has been used by faculty and students for research and teaching. We also do regular tours of the station for our courses. Last year we added a number of new instruments and filmed a fun, educational video about the station and its operation.

Some fun facts about you?

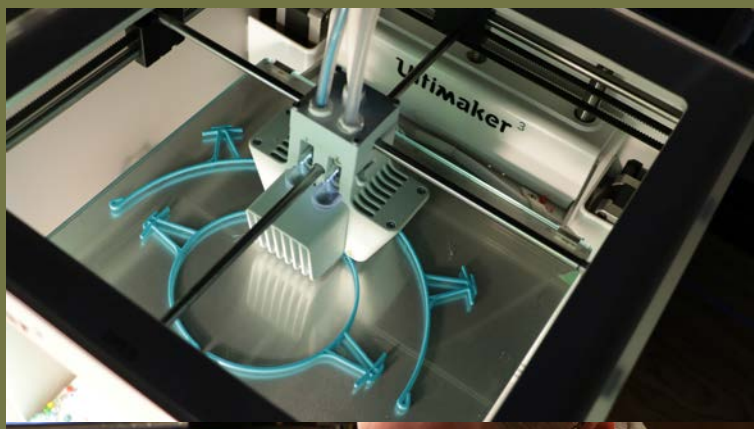
I collect vinyl records. I probably have over 300 albums at this point and usually post my "album of the week" outside my office every Monday.

In the last few years I've gotten into furniture design and woodworking – making simple pieces for our home and for family. It's challenging and I don't think I'm particularly good at it but nothing I've made has collapsed or injured anyone (yet) so I see that as a success.

Any Recent Accomplishments?

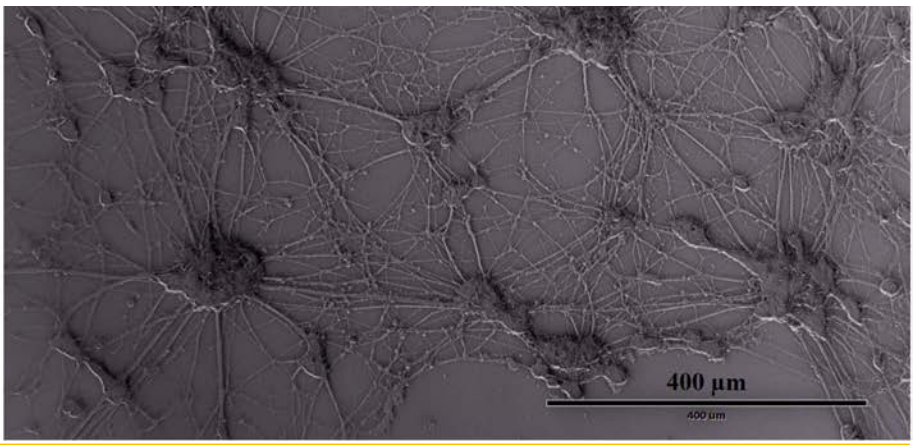
When the COVID-19 pandemic first began to hit Ontario, there was a call for those with access to 3D printers to help manufacture PPE for Scarborough-area hospitals. I heard that some members of UTSC community had gotten involved and I felt compelled to do the same. With the department's support, I brought the DPES printer and a bunch of filament home and began printing visors for face shields. 3D printing is a slow process; it takes about two hours to complete one visor so we had the printer running almost around the clock in our house. In the end we were able to print and donate over 120 visors to Michael Garron Hospital. These were then assembled into face shields for doctors, nurses and other frontline workers. Our work got a small mention in the UofT Bulletin and on CBC News Toronto, and I received appreciative messages from the Dean and President Gertler, which was humbling and unexpected. We have the luxury of staying safe at home while others are putting themselves at risk every day, so I'm just glad we were able to contribute in some small way.

Read it here!
https://www.cbc.ca/news/canada/toronto/front-line-heroes-apr-25-1.5544271



3D Brain Network- Microscopy image of mature neurons in 3D architecture, which was developed by differentiating the cancer cells in Kerman's lab.

Kagan Kerman, Soha Ahmadi, and Qusai Hassan



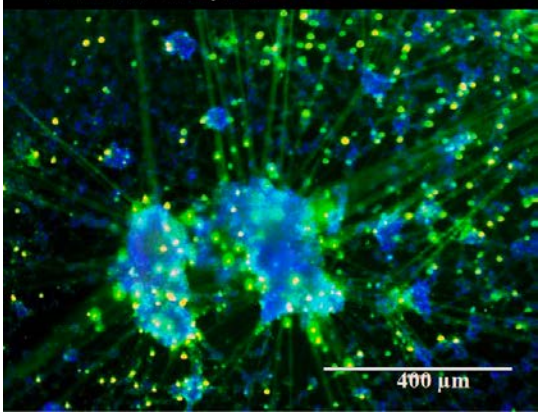
Neurons in a Dish

Images by Soha Ahmadi

First Report of 90 days survival of neuronal cells

Applying Retinoic Acid, a metabolite of vitamin A, to promote the differentiation of cancer cells to neurons is a simple and cost-effective way but cannot produce mature neurons and the differentiated neurons only survive for few days. By an innovative method that was developed by Kerman's team, using only Retinoic Acid, cancer cells differentiated to the mature neurons in 3D architecture, without using the extra gel. The neurons were survived for more than 90 days in a dish.

Fluorescence image of mature neurons in 3D architecture in day 91.



Creating 3D Architecture

3D Neuronal Culture a "New Dimension of Biology"

For the first time in the Department of Physical and Environmental Science, Professor Kagan Kerman and his team developed the 3D cell culture model of the neurons.

The new tissue culture facilities have been established just less than 2 years ago with an extensive effort of Kerman's team at DPES to conduct research on developing new therapeutic agents for neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease. The research was initiated by Dr. Ari Chow and Dr. Aruna Raja to investigate the effect of cannabis extracts in Alzheimer' disease using the traditional 2D cell culture system. Professor Kerman explained, "by the legalization of cannabis in Canada in 2018, it was an emerging need to find more about the benefit and toxicity threshold of the cannabis products". In a collaborative project with industry and the funding support of MITACS and Ontario Centres of Excellence, Kerman's team has studied the medical benefit of cannabis extracts in Alzheimer's disease. "Recent advances of the 3D *in vitro* model encouraged us to start working on 3D neuronal culture, which was initiated by Dr. Soha Ahmadi who joined our team last year" Prof. Kerman said. He continued, in less than six months, we were able to develop the 3D neuronal culture by differentiating the neuroblastoma cells, a kind of cancer cells, using a natural gel of extracellular matrix, which was not possible without hard work of Dr. Ahmadi and PhD student Qusai Hassan.

A well-developed 3D *in vitro* model of neurons will reduce the failure rate in drug design for Alzheimer's disease

Prof. Kerman's team plan to design a more advanced 3D model of the brain for drug screening assays by coculture the neurons and astrocytes, another important cell type in the brain, which would specifically mimic the cellular conditions of Alzheimer's disease. They will differentiate stem cells, which will be provided by their collaborator, Ichan School of Medicine at Mount Sinai in NYC, to develop these two cell types for their research on finding novel therapeutic agents for Alzheimer's Disease.

DPES PROGRAMS SUMMARY

TOTAL PROGRAMS: 16

COOP PROGRAMS: 9

COMBINED DEGREE PROGRAMS: 3

CHEMISTRY

Chemistry Specialist
Chemistry Major
Biochemistry Major
Biological Chemistry Specialist
Environmental Chemistry Specialist

PHYSICS AND ASTROPHYSICS

Physics and Astrophysics Specialist
Physics and Astrophysics Major
Physical and Mathematical Sciences Specialist
Physical Sciences Major

ENVIRONMENTAL SCIENCE

Environmental Biology Specialist
Environmental Geoscience Specialist
Environmental Physics Specialist
Environmental Science Major
Environmental Science Minor
Natural Sciences and Environmental Management Minor

ENVIRONMENTAL STUDIES

Environmental Studies Major

CO-OP

Chemistry Specialist - Coop
Chemistry Major - Coop
Biochemistry Major - Coop
Biological Chemistry Specialist – Coop
Environmental Chemistry Specialist – Coop
Environmental Biology Specialist-Coop
Environmental Geoscience Specialist-Coop
Environmental Physics Specialist- Coop
Environmental Science Major-Coop

COMBINED DEGREE PROGRAMS

HONOURS BACHELOR OF SCIENCE / MASTER OF ENGINEERING

HONOURS BACHELOR OF SCIENCE / MASTER OF ENVIRONMENTAL SCIENCE

HONOURS BACHELOR OF SCIENCE OR HONOURS BACHELOR OF ARTS / MASTER OF TEACHING

UNIVERSITY OF TORONTO SCARBOROUGH

DPES DIGEST IS LOOKING FOR YOU!

Interested in assisting with the DPES newsletter?
Have any great ideas you want to come to light?
Send us your resume!

Email: karyna.hanif@mail.utoronto.ca

EDITORS:

DR. SHADI DALILI

KARYNA HANIF

VITHUSHA COOMARAN