

SMR X Hackathon Design Challenge



Prepared by: Sharman Perera, P.Eng.

Introduction

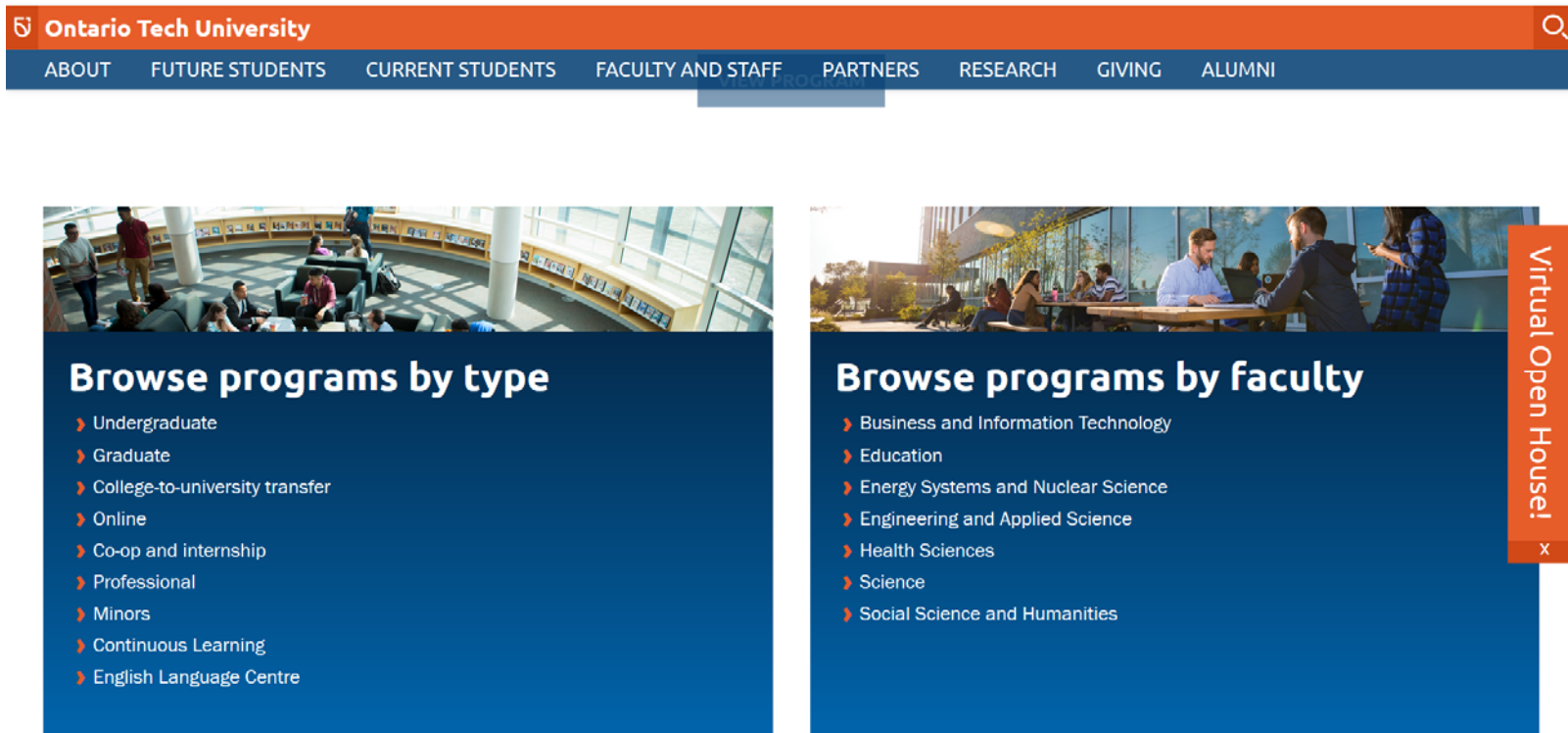
Ontario Tech is delighted to work with Inspire Tech Canada to run the first of its kind interactive SMR X Hackathon Challenge on **June 06, 2020 from 11 AM to 3:00 PM.**

This opportunity will provide high school students with relevant skills, to establish a new professional network, to learn about the hundreds of jobs that support the energy and nuclear sectors, and how their ideas could shape and influence a greener, low-carbon footprint future.

During this event, youth, teachers, parents, and community will get a chance to virtually tour the labs under the Faculty of Energy Systems and Nuclear Science, and to participate a series of seminars related to Energy, Nuclear Power, Small Modular Reactors (SMR) and Virtual Reality (VR) technology. Most of these seminars and lectures will be conducted by the faculty members from Ontario Tech University and Industry partners.

Additionally, the industry's largest organizations and stakeholders will be participating in this event to see what the next generation Leaders of Tomorrow can create in terms of new ideas and solutions. As anticipated today's youth interested in energy and climate change may one day see changes come to fruition. It's also the opportunity to see how technology is being used to train, collaborate, learn, share, and problem solve today despite the pandemic and social distancing standards

Ontario Tech University



The screenshot shows the Ontario Tech University website. At the top is an orange header with the university logo and name, and a search icon. Below this is a dark blue navigation bar with links: ABOUT, FUTURE STUDENTS, CURRENT STUDENTS, FACULTY AND STAFF, PARTNERS, RESEARCH, GIVING, and ALUMNI. The main content area features two large blue boxes. The left box, titled 'Browse programs by type', lists: Undergraduate, Graduate, College-to-university transfer, Online, Co-op and internship, Professional, Minors, Continuous Learning, and English Language Centre. The right box, titled 'Browse programs by faculty', lists: Business and Information Technology, Education, Energy Systems and Nuclear Science, Engineering and Applied Science, Health Sciences, Science, and Social Science and Humanities. To the right of these boxes is a vertical orange sidebar with the text 'Virtual Open House!' and a close button 'x'. The background of the website features images of students in a modern, bright interior space.

Ontario Tech University

ABOUT FUTURE STUDENTS CURRENT STUDENTS FACULTY AND STAFF PARTNERS RESEARCH GIVING ALUMNI

Browse programs by type

- › Undergraduate
- › Graduate
- › College-to-university transfer
- › Online
- › Co-op and internship
- › Professional
- › Minors
- › Continuous Learning
- › English Language Centre

Browse programs by faculty

- › Business and Information Technology
- › Education
- › Energy Systems and Nuclear Science
- › Engineering and Applied Science
- › Health Sciences
- › Science
- › Social Science and Humanities

Virtual Open House! x

Visit us: <https://ontariotechu.ca/>

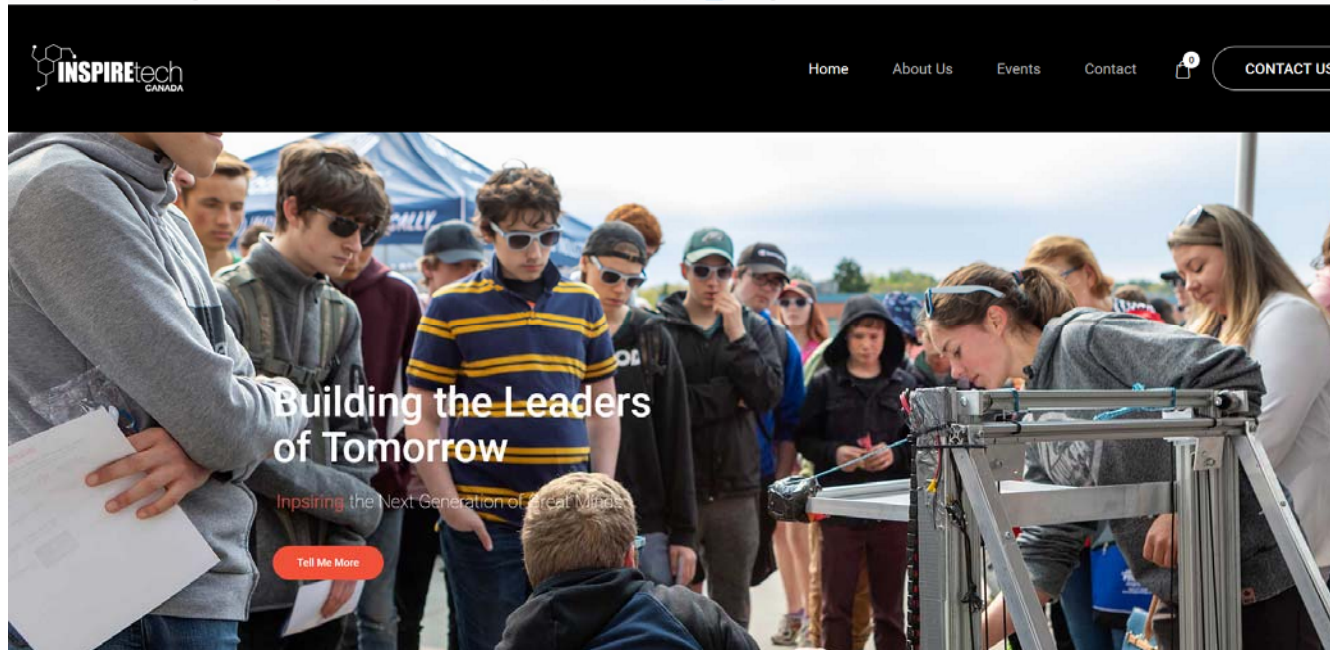
Faculty of Energy Systems and Nuclear Science (FESNS)



Visit us: <https://nuclear.ontariotechu.ca/>

SMR X Hackathon Design Challenge - June 06, 2020 from 11 AM to 3 PM

Inspire Tech Canada



Inspire Tech is an organization focused on making a difference to educate and impact youth across Canada. By providing access to meaningful Trades, STEM and Industry 4.0 Resources with out costs or barriers; we are able to Build more Leaders of Tomorrow with the best available technology today.

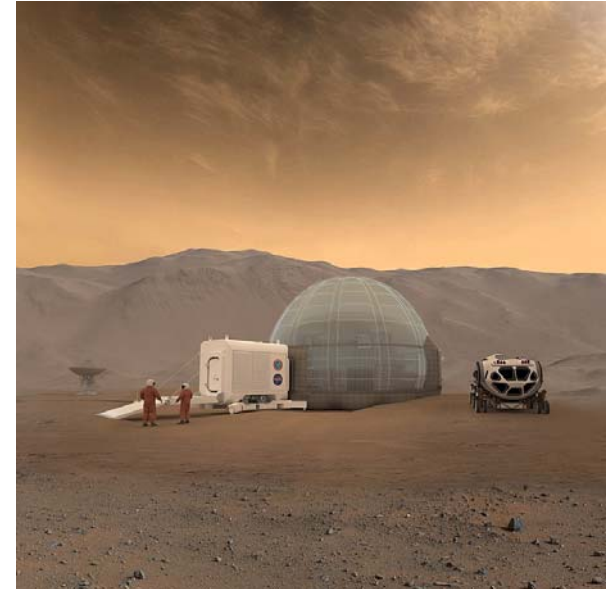
SMR X Hackathon Design Challenge - June 06, 2020 from 11 AM to 3 PM

SMR X Hackathon challenge

Problem Statement

The first colony of settlers is on its way to Mars!

In this SMR X Hackathon challenge , you will be a member of a design team given the task of designing a Small Modular Nuclear Reactor (SMR) using software and design solutions that are literally out of this world! You will work as a team, with the knowledge and support of mentors. Using design thinking, you will ideate and innovate to solve the problems that will face the first human colony on Mars. You will share your prototype with judges for the chance to win amazing prizes for you and your teammates.



https://upload.wikimedia.org/wikipedia/commons/5/5f/Mars_Ice_Home_concept.jpg

SMR X Hackathon challenge

What is a design challenge?

This is a dynamic innovation competition which brings together people with different skill sets to solve challenges. Participants meet, ideate, and form teams to help solve some of the important engineering challenges with the knowledge and support of mentors. The design-thinking framework is used as the backbone of the process to ensure that solutions address the challenge. It also helps teams focus their creative energy on building out a prototype to show the judges.

SMR X Hackathon challenge

What is a design challenge?

Build the first nuclear reactor on Mars!

The first colony of settlers is on their way to Mars and they need power! You are the chosen design team, taken from earth, to help build an entire colony with its main energy source coming from a nuclear reactor. In this challenge each team will design a component of the nuclear site using software and design solutions that are literally out of this world.

Each team will be responsible for designing a specific component and these will be assigned to a team on the day of the event.



SMR X Hackathon Design Challenge - June 06, 2020 from 11 AM to 3 PM

SMR X Hackathon challenge

COMPONENTS TO BE DESIGNED:

Nuclear Containment – design a structure that will house the nuclear reactor and protect your colony from radioactive materials (alpha, beta, gamma radiation) and thermal heat and protect the reactor from the Martian environment.

Nuclear Security – design a solution to secure the nuclear site. Your solution will need to protect and detect responses to theft, sabotage, unauthorized access (e.g. by unknown lifeforms on Mars) and other potential threats.

Back-up Power – design a solution that will allow the reactor to keep operating in the event of loss of power (e.g Martian Sandstorm).

Waste Storage – design a solution for safe storage of radioactive waste generated from the reactor given the slow decay of isotopes and constraints of the Martian environment.

Excess Energy Uses – design a solution to redirect and utilize excess power from the nuclear reactor – beyond powering the colony grid (e.g. powering electric Mars Rovers).

SMR X Hackathon challenge

CONSIDERATIONS

- Your design must take into account the weather elements on Mars: dust storms, harsh winters and snow fall, tornadoes, and even the possibility of an earthquake.
- The design must utilise current known technologies (sorry no anti-gravity devices or teleportation solutions).
- The design must account for the atmosphere of Mars (mostly carbon dioxide) - how will this affect the materials you chose to work with and will they last for the life of the reactor.
- The design must account for the small workforce (you are a small team and will not have others to help you build the solution).

SMR X Hackathon challenge

JUDGING CRITERIA

Designs will be judged on:

- **Originality-** Have you gone where no one else has gone before?
- **Challenge-** How well does the proposed solution address the challenge statement?
- **Technical feasibility-** Is the proposed design based on logical and sound engineering analysis and judgment? Has the team addressed the major technical challenges and constraints?
- **Presentation-** How well does the team describe and pitch their concept to the judges?

The final product for presentation must be visual: Powerpoint, conceptual model, or demonstration. We can't wait to see your creations! Final presentations are to be 3 minutes, with 2 minutes for questions from the judges.

Event schedule

- Lecture series (May 05 to June 02)
- Ontario Tech U Open House and FESNS Virtual Lab tour (May 23)
- SMR X Hackathon Design Challenge (June 06)

Lecture schedule

Lecture 1:

Topic: Radiation Science and Nuclear Engineering Fundamentals.

Presenter: Dr. Filippo Genco

When: Tuesday, May 05, 2020, from 1:45 PM to 2:45 PM

Google Hangouts meeting link for outside Ontario Tech participants:

<https://bit.ly/3fo0Tyk>

Lecture 2:

Topic: Renewable Energy.

Presenter: Dr. Jennifer McKellar

When: Tuesday, May 12, 2020, from 1:00 PM to 2:00 PM

Google Hangouts meeting link for outside Ontario Tech participants:

<https://bit.ly/2xCOaXB>

Lecture 3:

Topic: Small Modular Reactor (SMR)

Presenter: Dr. Kirk Atkinson

When: Tuesday, May 19, 2020, from 1:00 PM to 2:00 PM

Google Hangouts meeting link for outside Ontario Tech participants:

<https://bit.ly/3dnOb0N>

Lecture 4:

Topic: Introduction to Virtual Reality (VR) technology

Presenter: Dr. Alvaro Quevedo

When: Tuesday, May 26, 2020, from 1:00 PM to 2:00 PM

Google Hangouts meeting link for outside Ontario Tech participants:

<https://bit.ly/3cagwaK>

Lecture 1: Radiation Science and Nuclear Engineering Fundamentals (L1-1/2)



Dr. Filippo Genco
Associate Teaching Professor - FESNS

Professor Genco joined the Faculty of Energy Systems and Nuclear Science in January 2020 as Associate Teaching Professor. His previous academic experiences have been in Santiago, Chile at Adolfo Ibáñez University in quality of Assistant Professor and Chair of the Mechanical Engineering Department, in Abu Dhabi, capital of UAE and in USA, Indiana at Purdue University. Dr. Genco holds degrees in Mechanical Engineering (B.S & M.S.) from the Polytechnic of Bari, Italy and degrees in Aerospace Engineering (MS) and Nuclear Engineering (MS & PhD) from Purdue University. Dr. Genco is also a member of the American Nuclear Engineering Honor Society Alpha Nu Sigma and winner of the prestigious University of California Institute of Global Conflict and Cooperation Summer fellowship. His expertise is in nuclear energy, advanced numerical methods applied to heat and mass transfer and energy conversion systems. Professor Genco's research interests include nanostructure formation in materials under extreme conditions, intelligent systems applied to energy problems and power plants hybridizations and engineering education challenges in the 21st century.

Abstract for Lecture 1 (L1-2/2)

The 21st century dual challenge of reducing harmful GHG emissions, while still providing more and more energy to millions of people, positions the energy sector at the heart of achieving sustainable development. There is no technology that is fully without risk to people or the environment. Many countries in the world are working towards an electrical grid where both renewable and nuclear energy sources are the major players for achieving a more sustainable way of life. Nuclear science and nuclear engineering technologies will be briefly discussed at the light of the deep impact they have in our modern society. From nuclear power plants to space exploration, from medical radiological therapies to food irradiation applications, nuclear science has become of critical importance and in need of more and more bright people to form as future professionals. With the electro-mobility revolution at hand, few key questions about “why should I become a nuclear engineer?” will be answered providing ideas on how problems can be turned into opportunities thanks to nuclear science.

Lecture 2: Renewable Energy (L2-1/2)



Dr. Jennifer McKellar is an Associate Professor in the Faculty of Energy Systems and Nuclear Science at Ontario Tech University and a licensed Professional Engineer in Ontario. She leads the Energy Systems Analysis research group. The group's goal is to contribute to the development of sustainable energy systems by (1) developing analytical tools in support of decision- and policy-making, and (2) completing techno-economic and environmental assessments of energy systems. Dr. McKellar has taught courses on Solar Energy Technologies, Fuel Cell Design and Life Cycle Assessment. Her undergraduate and Master's degrees are in Chemical Engineering, and her doctorate is in Civil Engineering, with a focus on Environmental Engineering.

Dr. Jennifer McKellar
Associate Professor - FESNS

Abstract for Lecture 2 (L2-2/2)

The need to improve the sustainability of our energy systems is a significant challenge facing all of us. We need to continue to supply large amounts of reliable energy to provide important services such as lighting, heating, transportation and communications. We also need to reduce the negative impacts of energy supply and use to help protect the environment and human health. Meeting this challenge is going to require creativity and skill, and a wide range of technologies. This includes renewable energy technologies. We can generate electricity from solar, wind, and hydro resources, among others. Heating can be supplied through solar and geothermal energy, for example, while transportation can make use of biofuels, for instance. As with all energy technologies, renewable energy systems have advantages and disadvantages that must be considered before the technologies are implemented. However, when included in our energy systems skilfully, and in increasingly creative ways, they can be used to help us move toward a more sustainable future.

Lecture 3: Small Modular Reactor: Designs, Opportunities and Challenges (L3-1/2)



Dr. Kirk Atkinson
Associate Professor - FESNS

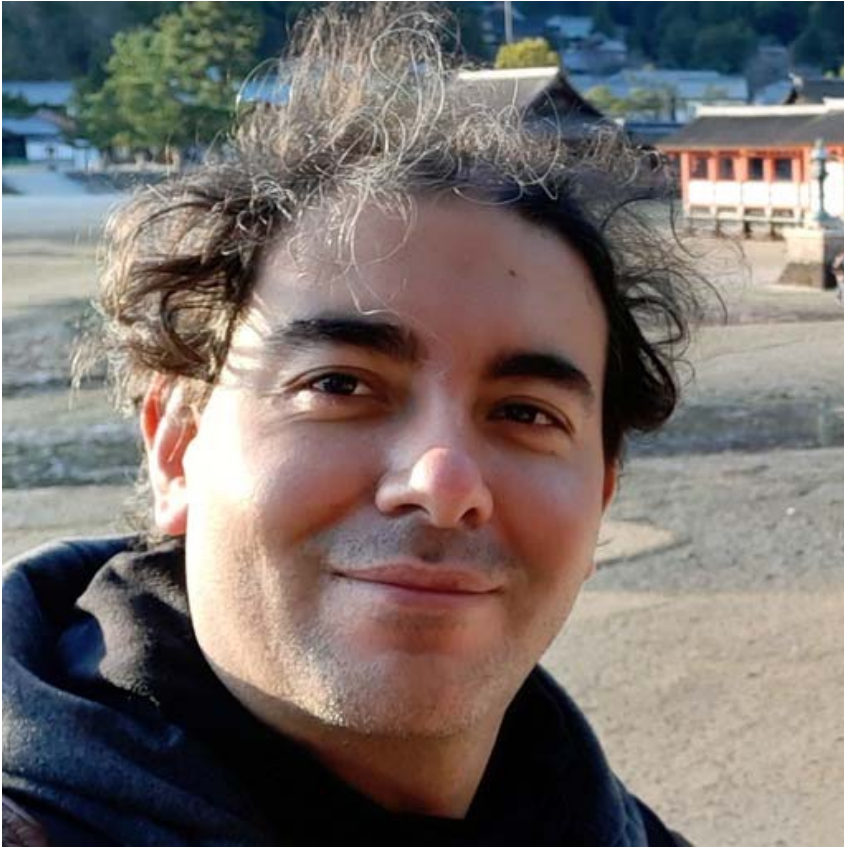
Dr Atkinson graduated from the University of London with a BSc in Theoretical Physics in 1999, an MSc in Astrophysics in 2001, and an MRes in Image and X-ray Physics in 2002. He joined the Gray Laboratory in 2002 as a Research Associate and PhD student on a US DOE-funded project on low-dose radiation. After postdoctoral work at the Diamond Light Source, in 2008 he joined the Ministry of Defence as Senior Lecturer in Nuclear Science in the Nuclear Department, the UK's only dedicated Nuclear Engineering School. He became Technical Lead for Reactor Physics and High Performance Computing in 2012, and for Radiation Physics and Criticality in 2018. Since 2014, in collaboration with Rolls-Royce, he led a multi-million dollar technical effort to develop a high-throughput Gamma Emission Tomography system (EGRET) for imaging and characterisation of spent nuclear fuel. Since 2016 he has been collaborating with Idaho National Laboratory on modelling and simulation of reactors using the MOOSE framework. He has supervised three PhD and over twenty MSc students, and between 2008 and 2015, taught all Royal Navy nuclear engineers. An expert on Small Modular Reactors in the marine context, he served on the Physics Working Group and Science Support Network for the UK Naval Nuclear Propulsion Program (NNPP), was part of the team assessing nuclear power options for future Royal Navy submarines, and co-authored a report on marine power options for the UK's chief scientific advisor. A visiting lecturer at the University of Manchester, where he taught on the UK's NTEC MSc Program, he joined the Faculty of Energy Systems and Nuclear Science at Ontario Tech University as an Associate Professor in January 2019. He is an NSERC/UNENE Industrial Research Chair in Health Physics and Environmental Safety and is Founding Director of Ontario Tech's Centre for Small Modular Reactors (CSMR). He was a member of the CNS Council for 2019-2020.

18

Abstract for Lecture 3 (L3-2/2)

If we are going to be successful in the fight against climate change, we must end the burning of fossil fuels. Solar panels, wind turbines and other renewable energy technologies will play a vital role. However, the wind doesn't always blow, the sun doesn't always shine and, in colder regions of the world, snow and ice comes every winter. In many countries, nuclear power has been a safe, reliable technology, providing nearly zero carbon emissions as part of the energy mix for decades. But traditional large nuclear generating stations are expensive to build, have a big individual impact in the unlikely event of something going wrong and are often located far from where they are needed so residual heat is wasted. Small Modular Reactor (SMR) and Micro-Modular Reactor (MMR) designs are capable of being built in a factory with improved quality control and economies of scale, taking advantage of modern manufacturing techniques like 3D printing. Several dozen models have been proposed or are in various stages of development. Ten times smaller than existing nuclear plants in both size and power, appropriately-sized SMRs are capable of meeting grid-scale base load and surge electricity demands and could start replacing coal and gas plants within the next ten years. Ten times smaller than SMRs, MMRs can be transported to and from site using road, rail or water-based transport, thereby facilitating deployment in remote communities where energy supply is a limiting factor in quality of life and economic development, or to support energy-intensive industries such as mining. This presentation will make the case for SMRs and MMRs, describe several different designs and address some of the challenges in their deployment.

Lecture 4: Introduction to Virtual Reality (VR) (L4-1/2)



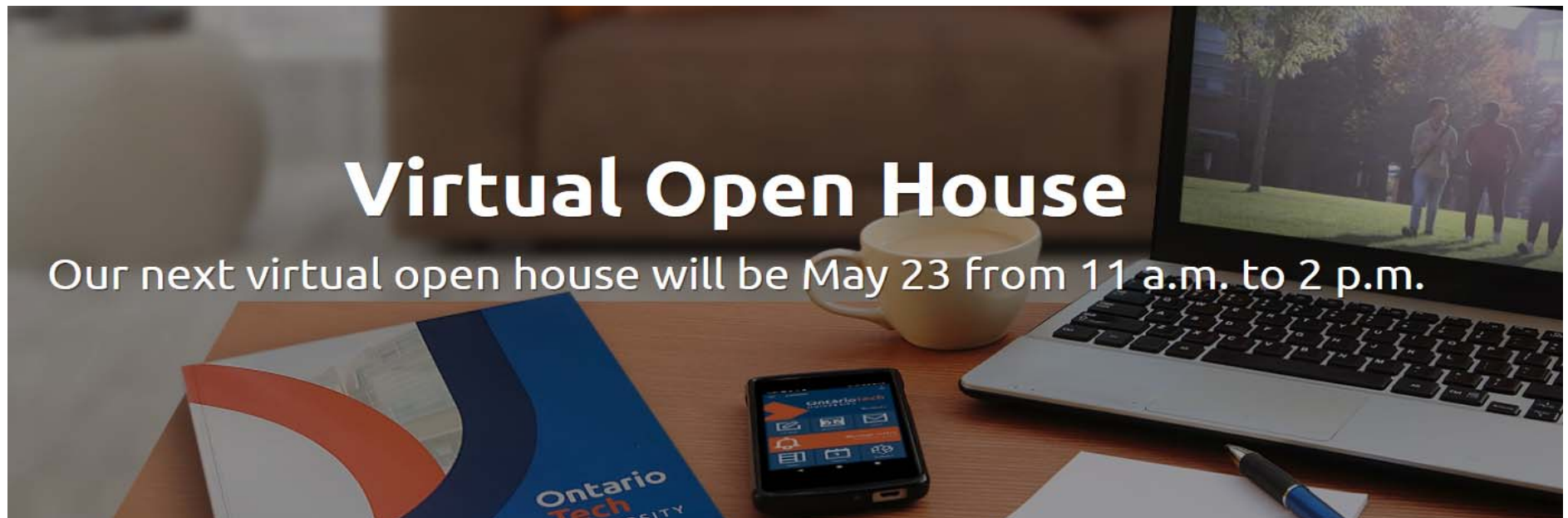
Dr. Alvaro Joffre Uribe Quevedo
Assistant Professor - FBIT

Alvaro Joffre Uribe Quevedo is an Assistant Professor at the Ontario Tech University. He received his bachelor's degree in Mechatronics Engineering from Universidad M. Nueva Granada - Colombia, followed by a Master and Doctoral degree in Mechanical Engineering from the Universidade Estadual de Campinas - Brazil. In September 2016 he concluded his Post-Doctoral appointment at the Games Institute at the University of Waterloo conducting research on the effects of games in medical training. His research interests are in virtual reality to develop applications and assessment tools to tailor the immersion and interactions towards effective inclusive and meaningful experiences. Recent projects include collaborations for the development of a framework to add interactivity to 360 videos, working at heights VR training, hand exergames, nuclear safety, non-immersive VR tools for reminiscence therapy for adults with dementia, and pick and place VR usability tools for customized experiences

Abstract for Lecture 4 (L4-2/2)

Virtual reality is currently gaining momentum as consumer-level devices become available at affordable prices. While traditionally employed in research and industry settings, current applications of virtual worlds have paved the way to enhance and complement education, training, health care, tourism experiences amongst others. This session will introduce attendees to virtual reality principles and considerations for developing consumer-level experiences with affordable tools. These same principles govern critical areas of development that will motivate participants to explore other areas of VR as higher-level devices become readily available. Similarly, software development tools are becoming more user friendly, welcoming non-programmers as potential developers and contributors within the VR development experience. At the end of this session, attendees will have a basic understanding of VR and developments tools associated to it.

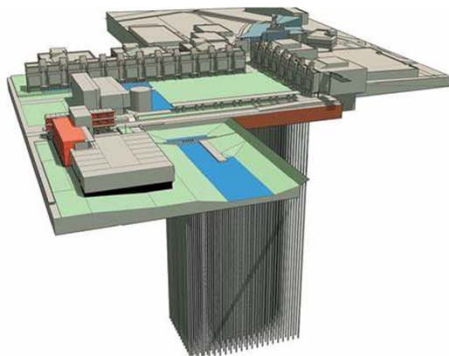
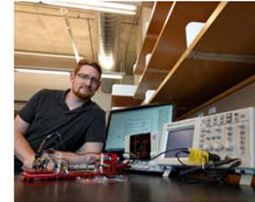
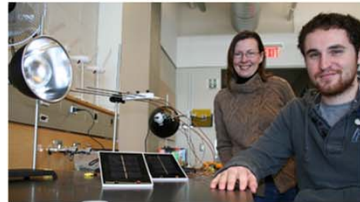
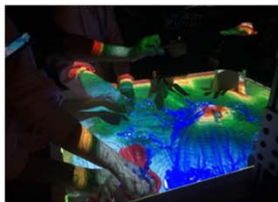
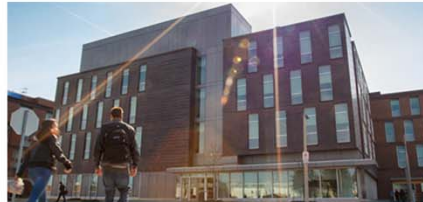
Open House (May 23 from 11 AM to 2 PM)



All students are welcome to attend Ontario Tech Open House

Please register for the Open House using this link: <https://ontariotechu.ca/openhouse/>

FESNS Virtual Lab tour (May 23rd from 11 AM to 2 PM)



SMR X Hackathon Design Challenge - June 06, 2020 from 11 AM to 3 PM

SMR X Hackathon Design Schedule (June 06, from 11 AM to 3 PM)

| Time | Event | Location |
|----------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 11:00 AM – 11:20 AM | Welcome and Introduction | Main room: https://bit.ly/2W6t6SP Livestream: https://bit.ly/2z8WcYH |
| 11:20 AM – 11:30 AM | Discussion of the rules | Main room: https://bit.ly/2W6t6SP Livestream: https://bit.ly/2z8WcYH |
| 11:30 AM – 02:00 PM | Design Challenge | In your own VR room Link will be provided to your group lead. |
| 02:00 PM – 02:45 PM | Judging the SMR X Hackathon Design | Main room: https://bit.ly/2W6t6SP Livestream: https://bit.ly/2z8WcYH |
| 02:45 PM – 03: 00 PM | Announcement of the winning teams | Main room: https://bit.ly/2W6t6SP Livestream: https://bit.ly/2z8WcYH |

Note: Only the **group lead** will attend the main room events.

Your group will have your own VR room. Link will be provided to the Group Lead during the **welcome and Introduction** event.

How to register for the SMR X Hackathon Design Challenge (Students and teachers)

Teachers can send an email to sigma.lab@uoit.ca with following information:

| | |
|----------------------------------------|--|
| High School Name | |
| High School Address | |
| | |
| Teacher Name | |
| Teacher Email Address | |
| | |
| Team Name | |
| | |
| Team Members Names and Email Addresses | |

Or student can use the link below to **register**:

<https://ontariotechu.ca/forms/online/view.php?id=677962>

Note: Deadline for registration is Saturday, May 30, 2020 at 11:59 PM.

How to register as a judge for the SMR X Hackathon Design Challenge

Please send an email to sigma.lab@uoit.ca with the information requested below if you are available to help students during the Design Challenge and/or Judging this event.

| | |
|-------------------------------------------------------------|--|
| Name of your Institution | |
| Your Name | |
| Your Email Address | |
| Please check your availability using the table below | |

| Time | Event | Availability |
|---------------------|------------------------------------|--------------|
| 11:30 AM – 02:00 PM | Design Challenge | |
| 02:00 PM – 02:45 PM | Judging the SMR X Hackathon Design | |

Judges list (as of May 06, 2020)

| Name | Position | Institution |
|--------------------|-----------------------------------------------------|-------------------|
| David Tyndall | Director - New Build (Engineering) | OPG |
| Robin Manley | Vice President, New Nuclear Development | OPG |
| Sharman Perera | Associate Teaching Professor and Laboratory Manager | On Tech U |
| Ryan Brown | | Moltex energy |
| Jose Zuniga | | Moltex energy |
| Dr. Alvaro Quevedo | Assistant Professor | On Tech U - FBIT |
| Dr. Kirk Atkinson | Associate Professor | On Tech U - FESNS |
| Dr. Filippo Genco | Associate Teaching Professor | On Tech U - FESNS |
| Robert Ulrich | Technician | On Tech U - FESNS |
| Callan Brown | Lab Specialist | On Tech U - FESNS |
| Khalid Rizk | Engineering Specialist | On Tech U - FESNS |

Mentors list (as of May 06, 2020)

| Name | Position | Institution |
|--------------------|------------------------------------------------------------------|-------------------|
| Daniel Cote | Section Manage (Engineering) - Darlington New Nuclear Project | OPG |
| Eric Mutzke | Senior Technical Engineer – Darlington New Nuclear Project | OPG |
| Sharman Perera | Associate Teaching Professor and Laboratory Manager | On Tech U |
| Dr. Alvaro Quevedo | Assistant Professor | On Tech U - FBIT |
| Dr. Kirk Atkinson | Associate Professor | On Tech U - FESNS |
| Dr. Filippo Genco | Associate Teaching Professor | On Tech U - FESNS |
| Robert Ulrich | Technician | On Tech U - FESNS |
| Callan Brown | Lab Specialist | On Tech U - FESNS |
| Khalid Rizk | Engineering Specialist | On Tech U - FESNS |

Google Hangouts Meetings

Students and teachers have the option of turning off their cameras and microphones when using Google Hangouts meetings during the lectures and design challenge.

Still, their Google account name will appear on the Chat Line and under the People tab.



Mozilla VR Hubs and help line

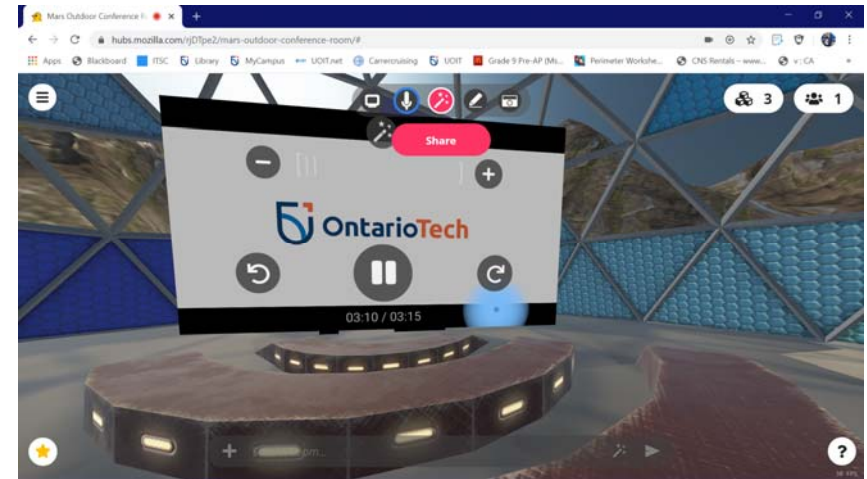
We are using Mozilla VR hub to conduct the Design Challenge.

Students and teachers can enter the VR room using the link below as an Avatar where they can set any name.

<https://hubs.mozilla.com/rjDTpe2/mars-outdoor-conference-room/>

Note: We will also be using Google Hangouts meetings during the design challenge to communicate with the attendees incase if they have any difficulties with Mozilla VR hub.

meet.google.com/iby-jyvk-egs

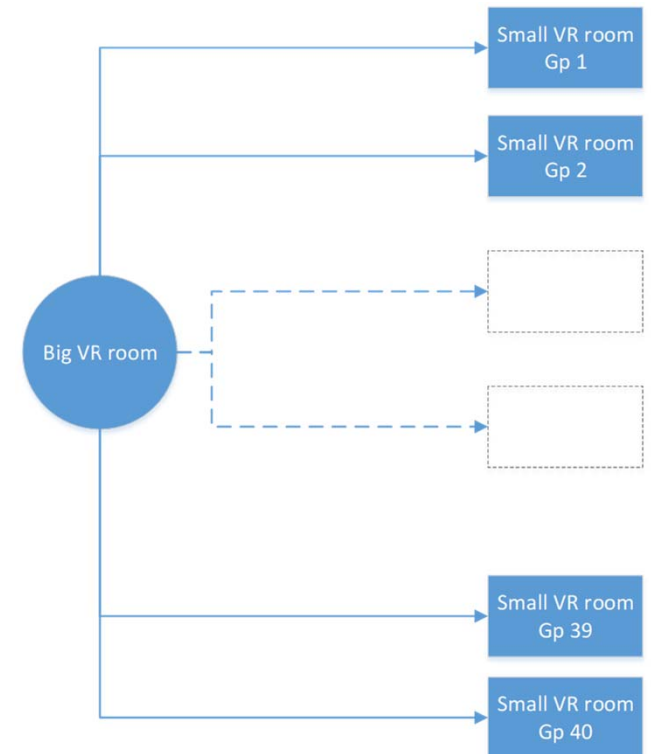


What is happening during the SMR X Hackathon inside the Mozilla VR Hubs

We will have one Big VR room and 40 Small VR rooms.

The main event will happen inside the Big VR room and student groups will work with their team members inside Small VR rooms.

Note: Only Mentor/Judges/Facilitator can move between Big VR room and Small VR rooms.



What is happening during the SMR X Hackathon inside the **big VR room**

The main event will happen inside the Big VR room
<https://hubs.mozilla.com/rjDTpe2/mars-outdoor-conference-room/>

We will live stream the event from the Big VR room.

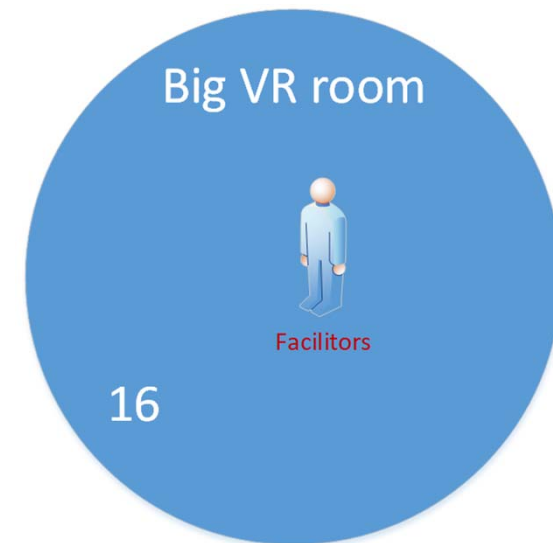
The main event details:

Opening Ceremony (11 AM to 11:30 AM)

- Welcome and Introduction
- Discussion of the rules

Closing Ceremony (2 PM to 3 PM)

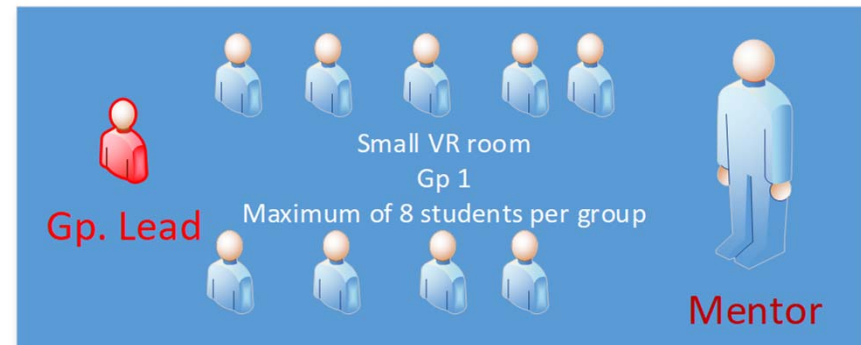
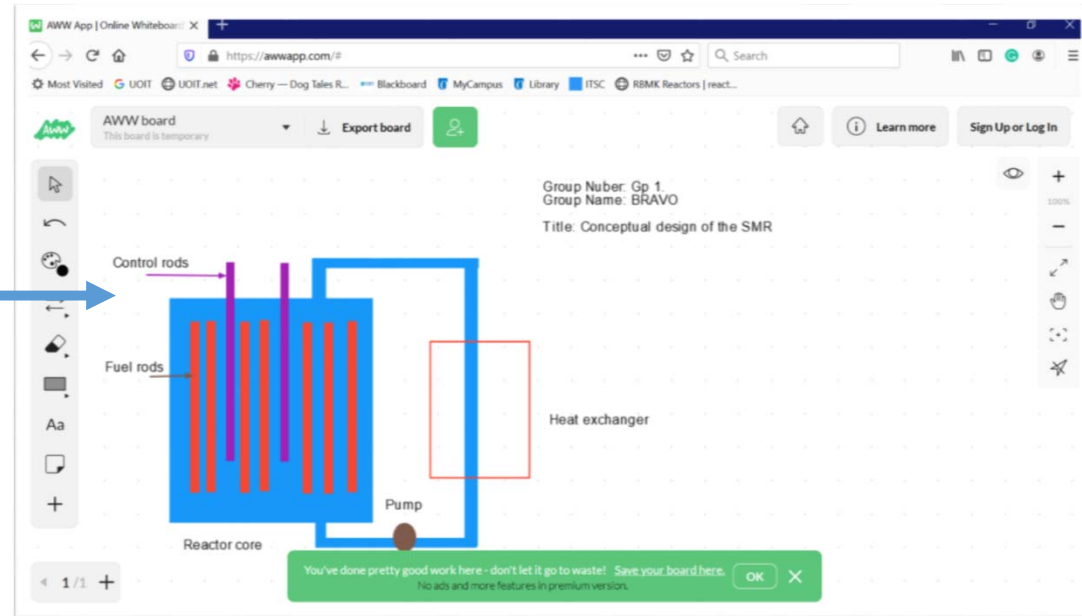
- One of your mentors will put up the posters on the board
- Judges will go around and evaluate your poster



What is happening during the SMR X Hackathon inside a **Small VR Room**

Design Challenge (11:30 AM to 2 PM)

- Student groups will build a conceptual design of a small modular reactor that can help the first group of people who will colonize the planet Mars using a sharable online drawing board given in the link below:
<https://awwapp.com/b/uz3nobxes3fkd/>
- Use given template to prepare your poster to produce the final conceptual design of the SMR.
- During the Design Challenge, mentors will join the small VR rooms to help students and teachers.
- Save your final conceptual design as a **image file** in the following format:
"GroupName_SMR_X"
- One of your mentors will hang your poster up in the Big VR room.
- You can see what's happening inside the main VR room using the TV located inside your Small VR room.



Help lines

- **Help during the competition** - meet.google.com/iby-jyvk-egs
- **General Help** – Sharman Perera – sharman.Perera@uoit.ca
- **Help with Mozilla VR hubs**
 - Samin Habibi-luevano samin.habibiluevano@ontariotechu.net
 - Ryan Brown - ryan.brown16@ontariotechu.net
- **Help with sharable drawing board**
 - Samin Habibi-luevano samin.habibiluevano@ontariotechu.net
 - Ryan Brown - ryan.brown16@ontariotechu.net
- **Help with registration for this event**
 - Nathalie Fitzsimmons - Nathalie.Fitzsimmons@uoit.ca
- **Help with marketing and adds**
 - Michelle Cholak - Michelle.Cholak@uoit.ca
- **Help with sponsorship**
 - Contact Kyle Boyko - Kyle.Boyko@InspireTech.ca
 - Lindsay Coolidge Lindsay.Coolidge@uoit.ca

We need you help in following areas

- Control the traffic inside the big VR room and help people to navigate through the VR space.
- MCs for the events
- Mentor students and teachers
- Judges



Media links for this event

Websites:

https://nuclear.ontariotechu.ca/about/fesns-upcoming-events.php?utm_source=banner&utm_medium=web&utm_campaign=welcome

<https://news.ontariotechu.ca/archives/2020/04/ontario-tech-experts-energizing-the-community-with-free-may-online-lectures.php>

<https://inspiretechcanada.ca/events/>

<https://www.octe.ca/en/news/smr-x-hackathon-challenge-grade-12-high-school-students>

<https://www.moltexenergy.com/news/details.aspx?positionId=147>

Social media sites:

<https://twitter.com/DrStevenMurphy/status/1256284530530553857>

https://twitter.com/canada_inspire/status/1253709811218251779/photo/1

https://twitter.com/OT_FESNS/status/1256030824023101445/photo/1

https://twitter.com/OT_FESNS/status/1256570641387577344/photo/1

<https://gramho.com/media/2299099289795992670>

<https://gramho.com/media/2299710174403038290>

https://www.linkedin.com/posts/sharman-perera-a0a6a887_ontario-tech-experts-energizing-the-community-activity-6661718876927078400-BhtV