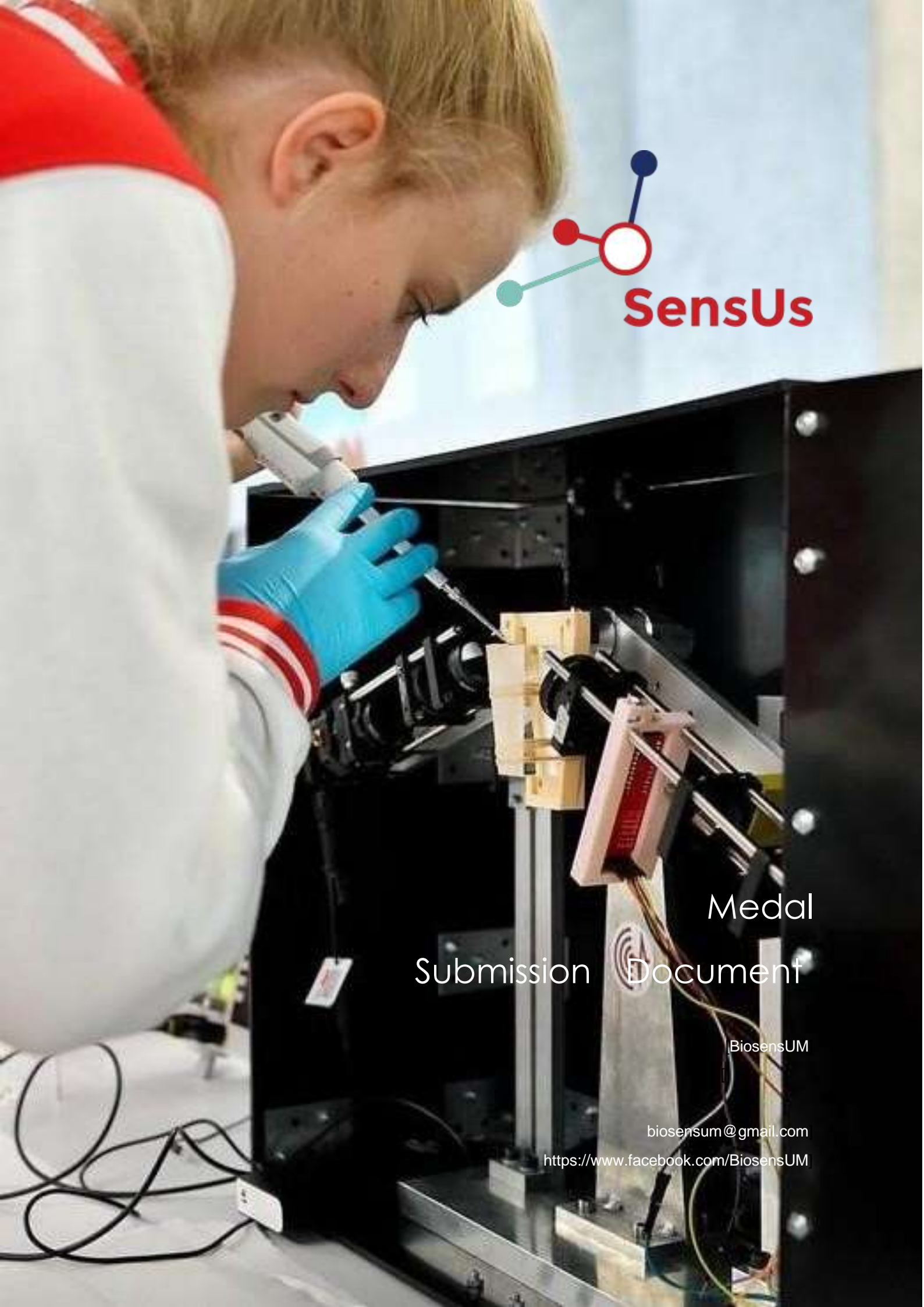




SensUs



Medal
Submission Document

BiosensUM

biosensum@gmail.com

<https://www.facebook.com/BiosensUM>

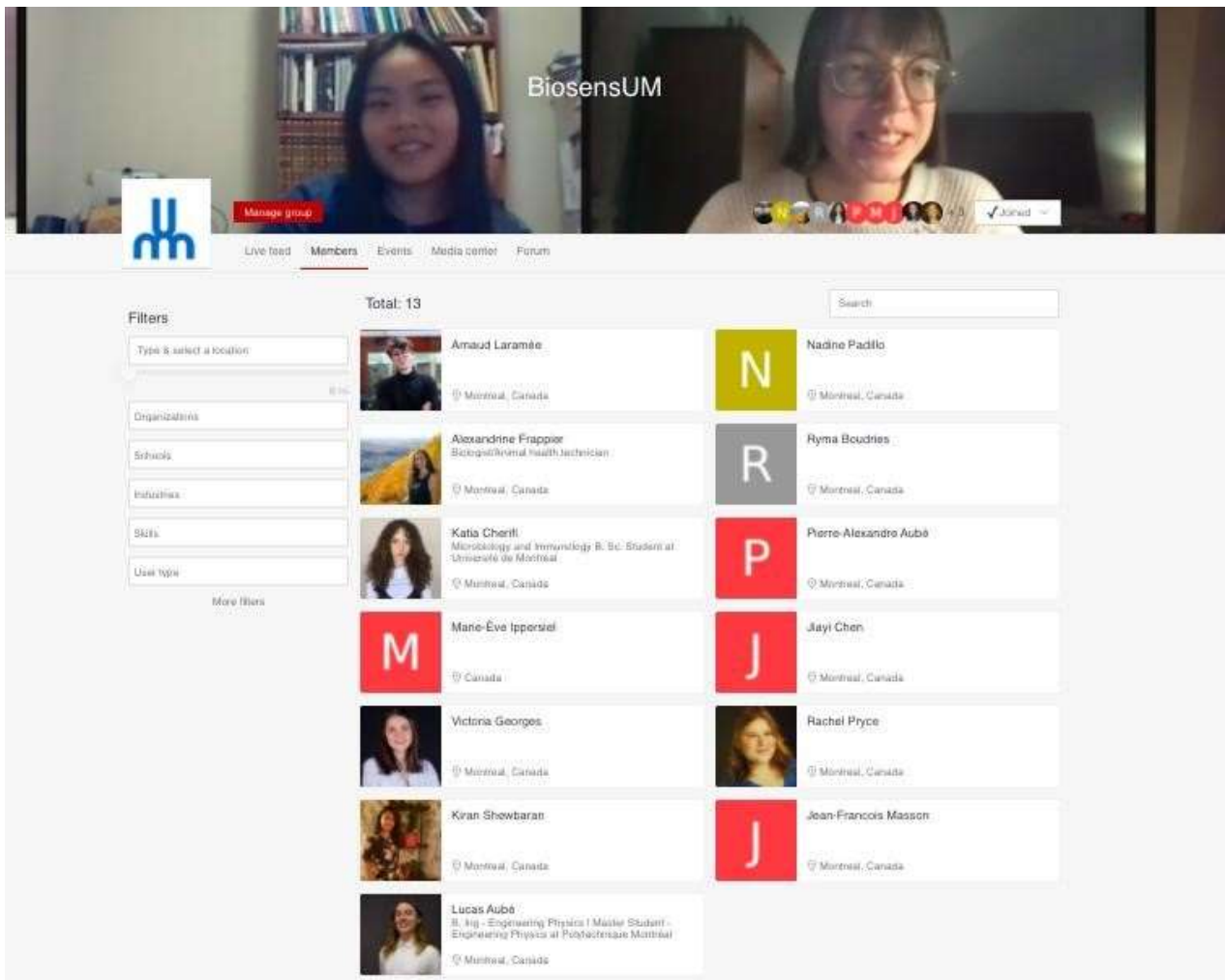
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January

1. Bronze

1.1 Register on SensUs Connect;



March

1. Bronze

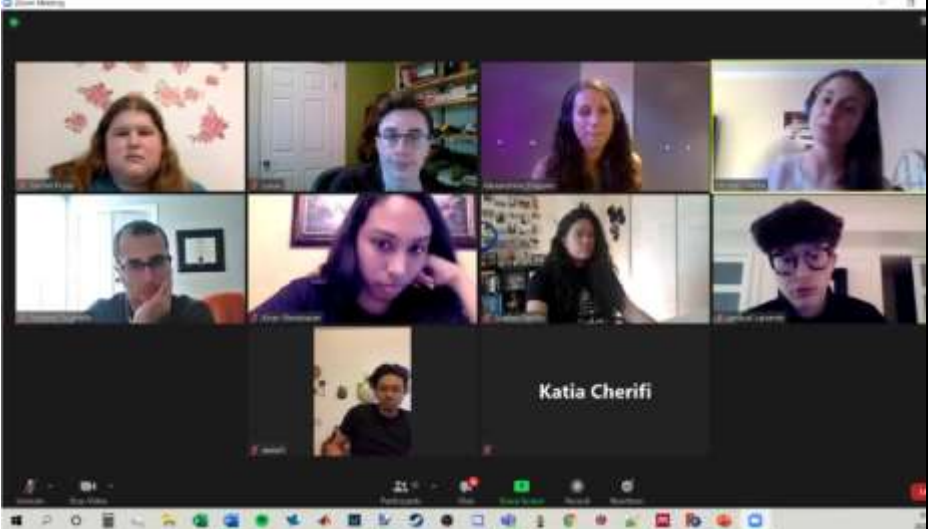
1.1 Motivation;

Every student in BiosensUM decided to enter the SensUs competition because they want to make a difference. We are highly motivated by the possibility of improving medical technology and maybe even save lives. We want to acquire field experience and bring something to the world during this troubling period that is the COVID-19 pandemic. By tackling this challenge, we want to improve and develop skills that will help us grow as scientists, but also as people. We will put together every team member's input to have the best results so that everyone has its place in the project. We intend to be as environmentally friendly as possible, to encourage small businesses and to produce a technology that would be easily accessible by setting the cost as low as possible while achieving our goals.

May

1. Silver

1.1 Meet with Alumni;

Attendees	Myriam Cliché (BiosensUM, 2019), Frédéric Fournelle (BiosensUM, 2018/2019), Arnaud Laramée (BiosensUM, 2020), Aaron Gabriel Nunez Avila (BiosensUM, 2020)
Goal of the Meeting	The goal of this meeting was first to have a contact with alumni. Then, we were seeking advice from people who had experience with the competition and the context. Finally, we wanted to have feedback on our design and business plan. Having alumni in our contacts to ask questions in the future is an advantage for us either for our biosensor or for team management.
Date	May 29 th , 2021
Preparation time	2 hours
Duration	2 hours
Summary	We did an ice breaker quiz to do a little fun before talking business. The alumni were really eager to help us and give us advice. We had good feedback on our design and we even changed an aspect on our concept thanks to them. We learned not to take we have for granted and start to prototype and write the TRD as soon as possible. They also told us we should make it as simple as we can and not try to waste time on complicated designs that would lower our biosensor's sensitivity. They also offered us advice on team management. The best advice we will follow is to do more team bonding activities where we are not working on the project and just enjoy ourselves. This would help team cohesion and we would work better together. Finally, to recommended to read the information package well so we know every criterion and write our TRD well. They suggested we don't hesitate to ask alumni or teachers for help if we are not sure about something. They offered us to keep contact and to help us whenever we need it.
Evaluation	The meeting was a really great opportunity to meet old members of the team and we had so much great advice. The meeting was a success.
Picture	

June

1. Silver

1.1 Interviews with medical professionals;

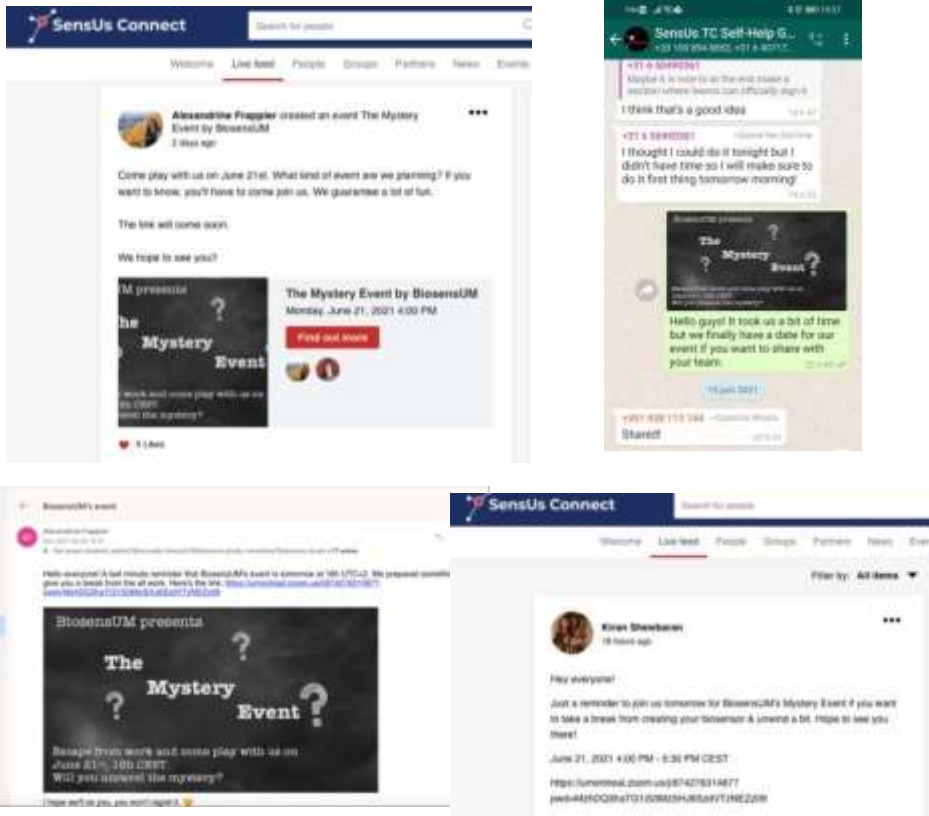
Professional Name	Dominic Pelletier
Short description about professional	<p>M. Pelletier is a resident physician in family medicine with a strong interest toward care of the elders. He is at is second and final year of residency.</p> <p>He was drawn to become a physician because of the human aspect of this profession and the intellectual challenge it represents.</p> <p>The general practitioner or family physician is generally the first to deal with any illness. When the illness goes beyond what he can do, he will refer the patient to a specialist.</p> <p>Respiratory viruses are well known by family physician since they are the ones caring in most cases for these illnesses.</p>
Conducted by	Lucas Aubé and Kiran Shewbaran were leading the interview. The other members of the team present were only listening to the interview.
Date	June 22 nd , 2021
Preparation time	5h
Duration	1h
Summary	<p>During the interview, we touched to a few categories of questions mainly the characteristics of respiratory viruses, the impact of these viruses on society, the usefulness of our biosensor and how our biosensor could be used. We present here a summary of the useful information gathered from the interview.</p> <p>Characteristic of respiratory viruses:</p> <p>Respiratory viruses are grouped together because they all exploit the respiratory track as an open door to get inside the body and infect a host. They constitute a quite heterogenous group of multiple viruses. From all the viruses that can attack the respiratory track, only influenza has a unique set of symptoms (the flu) and a potential treatment (Tamiflu). Tamiflu can be administered to reduce symptoms of the flu but is only use for precarious patient that might suffer a lot from the flu. The treatment for other viruses is only to wait for the immune system to do its job.</p> <p>As opposed to other viruses, respiratory viruses are quite tricky in the sense that it is challenging to be fully protected: we cannot stop breathing altogether.</p> <p>The best ways to mitigate respiratory viruses is to attack the chain of transmission by vaccination or by social distancing as we saw in the COVID-19 pandemic, to catch as early as possible when someone is infected so that person can be isolated (what our biosensor can offer) and to inform the public on the importance of following health guidelines.</p>

	<p style="text-align: center;">Impact of respiratory viruses:</p> <p>Before the pandemic, even though the general opinion was that respiratory viruses are not a big deal (« it's just a little cold »), they had quite a big cost on society. Population that are more at risk include young children and older adults that both have weaker immune system. In the case of young children, complication usually seen is ear infection or bronchiolitis. For older folks, comorbidity and the already push to its limit body can cause rapid decay of the patient state when face with a respiratory virus.</p> <p>The environments where respiratory viruses are the most dangerous are in small, enclosed spaces where there is a high density of people with personnel movement. Examples of such environments are prisons, schools, kindergarten, home for the elderly, etc.</p> <p>With the covid pandemic, new protocols of triage were introduced to segregate patient that might have a respiratory virus from other patients in hospital waiting rooms. Such protocol might stay after the pandemic to reduce the impact of respiratory viruses in hospital context. Our biosensor could be use in such a context.</p> <p style="text-align: center;">Our biosensor possible use and usefulness:</p> <p>Current influenza testing is uncomfortable for the patient, time consuming and costly. Therefore it is only done when there is a clear goal to the testing (knowing if a physician should administer Tamiflu). Our biosensor could have a new goal that would be to prevent the spread of the disease.</p> <p>Another benefice of our device is that if it could differentiate between different respiratory viruses that have the same symptoms, maybe specific treatment could be developed (like Tamiflu) and therefore reduce even more the impact of respiratory viruses in general.</p>
Evaluation	The interview was incredibly useful, and we learned a lot. It was great to discuss our project with a health professional and to put everything we are doing in context.

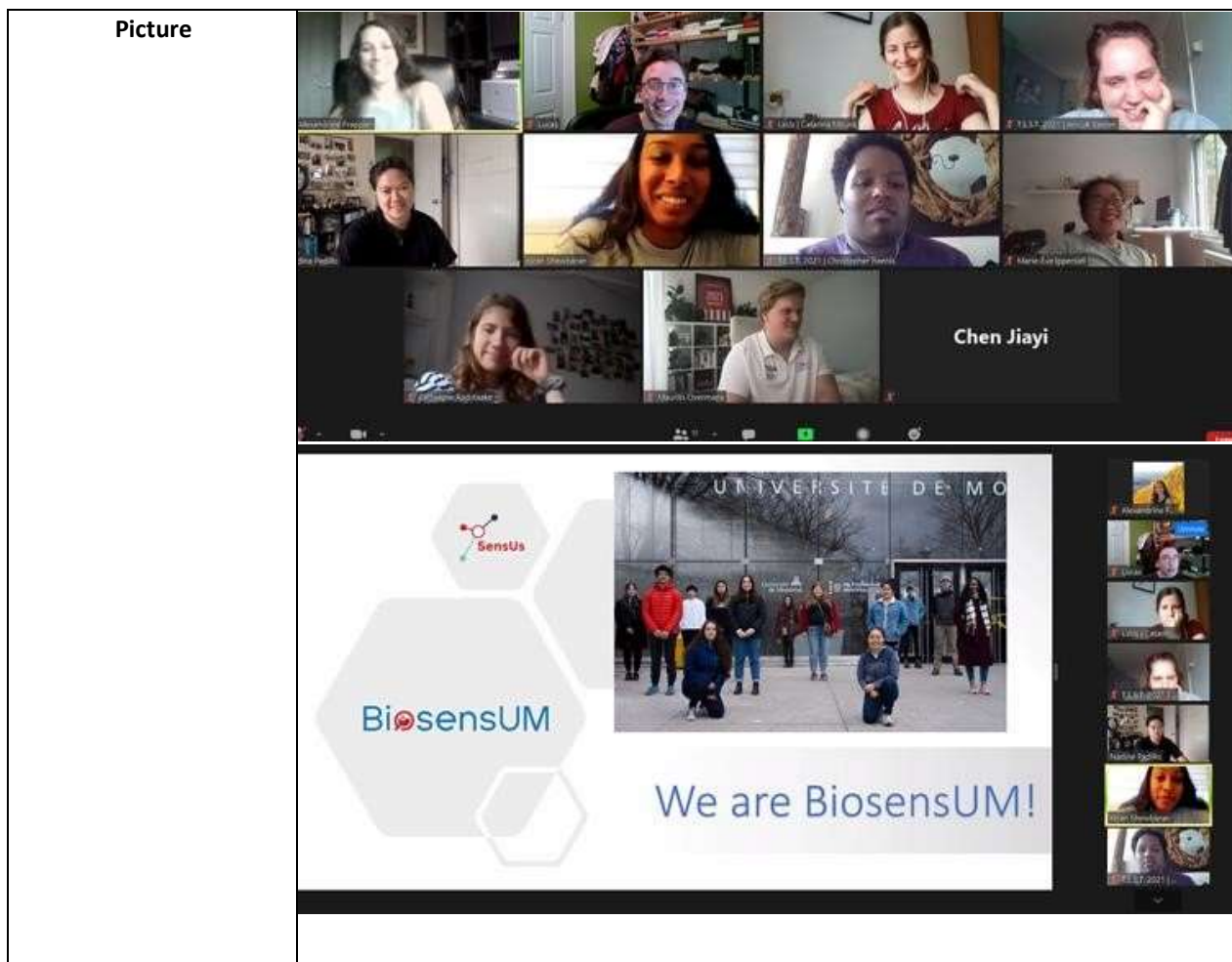
2. Gold

2.1 Organize online Event;

Title of Event	The Mystery Event
Date	June 21 st , 2021
Preparation time	8h
Type of event	Social activity

Abstract	The event is like a virtual escape room game. A hacker stole personal data from everyone and is giving them a chance to get it back. To recover their data, they have to resolve puzzles and enigmas in small groups to find clues leading to the hacker's identity with a time constraint.
Objective of activity	The event is for everyone to take a break from work and have fun together. It can also lead to teamwork between the different teams since they have to work together to resolve it.
Promotion	<p>We reached the other teams by posting twice on SensUs connect as well as reaching the other captains by Whatsapp and email.</p>  <p>The images show promotional posts on SensUs Connect and a WhatsApp chat. The SensUs Connect posts include: 1) A post by Alexandrine Frappier announcing 'The Mystery Event' on Monday, June 21, 2021 at 4:00 PM. 2) A post by BiosensUM presenting 'The Mystery Event' with a 'Find out more' button. The WhatsApp chat shows a group named 'SensUs TC Self-Help G...' with messages discussing the event date and time, and a shared post about the event.</p>

Partners	No partners were involved.
Contact person	The team captains: alexandrine.frappier@umontreal.ca; lucas.aube@polymtl.ca
Evaluation method	We will evaluate what we gained from this experience and what the other teams thought of our event with a survey.
Evaluation (fill in after the event)	
Number of participants	11
Lessons learnt	We learned that if we want to have more people attending our event, we need to promote it more in advance. Although, it was fun and people found it was a good break from work, more people could have enjoyed it. We learned it was a lot of coordination when you want to do something like we did.
Recommendations	Set a date in advance so that people can have time to see the publicity and more can join.




July

1. Silver

1.1 Meetings with a SensUs Partner;

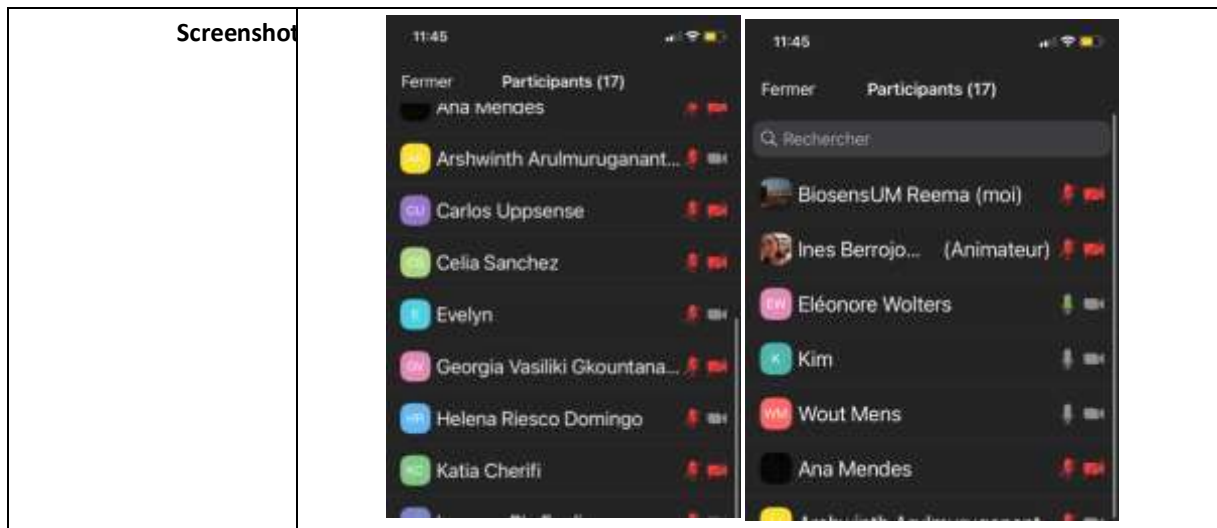
Partner	Medtronic
Attendees	Jesper Svenning Kristensen (Medtronic), Alexandrine Frappier (BiosensUM), Ryma Boudries (BiosensUM) and Nadine Padillo (BiosensUM)
Goal of the Meeting	This meeting's goal was to have an external view of an expert to help us find solutions to problems we encountered during tests in lab, especially concerning saliva's viscosity and bubbles. Also, we wanted an expert's opinion to help us decide whether or not we would use certain features. We had trouble deciding if using certain features were worth it and someone with experience with biosensors could help us greatly. Since most of our problems were in the biochemistry and surface chemistry, Medtronic was a good choice. We also found the people present during the partner session were nice.
Date	July 6 th , 2021
Preparation time	3h

Agenda	<p>1. Opening [2 min]</p> <p>a) Update: We have now opted for the LSPR technique using monoclonal antibodies as binding elements.</p> <p>b) Key Market: Pharmacies and small clinics.</p> <p>c) Currently: exploring ways to conjugate antibodies to gold nanoparticles coated on Ubent optical fibers.</p> <p>d) Remarks on the agenda</p> <p>2. Discussion about technical plan [16 min]</p> <p>a) Which method would minimize the presence of bubbles in our sample? I. Attempted SDS, now looking into PBS and other solutions to eliminate bubbles. II. Any advice on how to integrate a bubble trap in a microfluidic device (i.e.: configuration of inlets/outlets)</p> <p>b) How can we integrate conjugated gold nanoparticles to the antibodies in our biosensor?</p> <p>c) Do you have any experience using nanorods or nanoparticles as surface coating? I. Any nanorod organization that is more selective?</p> <p>d) Any advice on how to keep LSPR user-friendly? I. i.e.: simple maintenance and monthly calibration</p> <p>e) How can we make our product reusable and sustainable? I. How much wash time between sample analysis is usually needed? II. Is it possible or practical to make a cartridge reusable? III. How many rounds should we expect our antibodies to be effective?</p> <p>f) Which important regulations should be respected when using the LSPR technique? I. Disposal of biological fluids II. User-safety</p>
	<p>3. Closing [2 min]</p> <p>a) Do you have any suggested literature that would be useful for the development of our biosensor?</p> <p>b) Thank you for your help!</p>
Duration	30 minutes
Summary	<p>We could confirm that a few decisions we made were right like not using bubble traps, using nanospheres instead of nanorods. We also gained insight on the thinking behind the development so we won't overlook anything vital like for the calibration or validation of our biosensor. We also learned new information on the use of antibody conjugated nanoparticles that we didn't think of like making sure the antibody we use in the biosensor is not binding the same part of H1 as the antibody conjugated with nanoparticles. Finally, he gave us a great idea for a multiple use cartridge.</p>
Evaluation	<p>This meeting was a great help since we learned a lot and we gained new ideas for our concept.</p>
Minutes	30 minutes

Social Media Post	 <p>Biosensum - Université de Montréal SensUs Team À l'instant · 🌐</p> <p>Nous avons eu la chance de discuter avec un expert de Medtronic, leader dans le domaine la biotechnologie médicale. Nous avons reçu d'excellents conseils et des idées très intéressantes. Nous avons hâte de pouvoir vous présenter notre produit final! 😊</p> <p>We had the chance to talk with an expert from Medtronic, leader in the medical biotechnology field. We received great advices and really interesting ideas. We can't wait to show you our final product! 😊</p> <p>Medtronic</p> <p>J'aime Commenter Partager</p>
--------------------------	--

1.2 Be present at two online events;

Title of activity 1	Meet the Teams
Organized by	PULSe
Date	March 29 th , 2021
Type of activity	Networking, get together activity
Abstract	This activity's goal was to get the different teams to know each other, interact together and have a little break from all the work.
Objective of activity	Connecting students from the different teams and create a friendly environment in the competition.
Lessons learnt	The history of the university KU Leuven and that other team members are nice people.
Recommendations	Have more people in back up in case one has connection problems as to avoid disturbing the presentation.



Title of activity 2	The Mystery Event
Organized by	BiosensUM
Date	June 21 st , 2021
Type of activity	Social activity
Abstract	A little virtual escape game to let people have fun.
Objective of activity	Take a break from work and practice working in a group with people from different teams.
Lessons learnt	People work great together since they were able to resolve the puzzles quickly. Also, it is good to take a break and have fun once in a while.
Recommendations	Maybe promote the event earlier.
Screenshot	

2. Gold

2.1 Present at a professional Event;

Title of event	Forces AVENIR
Date	June 3 rd , 2021
Preparation time	15-20 hours
Type of event	Conference
Abstract	This event is a conference/interview given to a jury about the project for a competition between research projects in Quebec. This conference is in webdiffusion so that everyone can go online to watch it live.
Objective of event	Getting students to present their project to determine which ones they reward.
Partners	Entrepreneurs, researchers, educators
Contact person	Martine Côté (mcote@forcesavenir.qc.ca)
Evaluation method	We will evaluate what we gained and learned during this event
Evaluation (fill in after the activity)	
Number of participants	2 people from BiosensUM and 7 people from the jury were directly involved. About 100 people watched the interview live and the video is available on Youtube for anyone who would like to watch it.
Lessons learnt	We gained a lot during the event, mainly during the preparation. We learned how to pitch and to boast for our team. We also learned how to pitch well while staying natural, which is important because a presentation that looks forced is not interesting to watch. During the question period, we could practice our spontaneity to provide information. Since we are in competition with other universities, it provided a context close to the SensUs competition, so we learned how to make our team stand out from the other.
Recommendations	This kind of pitch needs practice to make it seem natural, so start preparing in advance.



August

1. Bronze

1.1 Tips for subsequent SensUs Teams

- Tip 1: Never assume you still have plenty of time to accomplish a task. It always leads to doing the task last minute.
- Tip 2: Use only one online platform for the team to avoid communication problems. Microsoft teams is great for communication and work within the team.
- Tip 3: Don't hesitate to contact group members privately when they don't seem to participate in the meetings. Sometimes they are just shy and are scared to talk to the whole team.

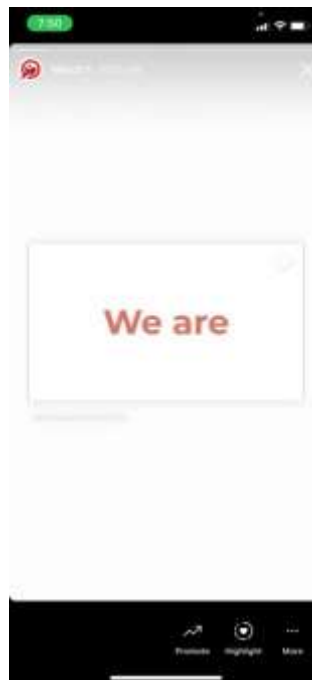
Valuable tips in the document:

- Have fun!
- Recognize everyone's contribution, accept and respect differences.
- Split the team into smaller teams (subgroups) based on different aspects of the project.

2. Silver

2.1 Reposts on social media;

March 1st, 2021



May 27th, 2021

BiosensUM - Université de Montréal SensUs Team 1 min · 🌐

Cet interview partagé par SensUs solidifie la nécessité d'un instrument qui nous permettra de détecter rapidement l'influenza et de mieux prévenir la transmission du virus. 🗣️

This interview shared by SensUs confirms the need of a tool to quickly detect influenza and have a better prevention of its spread. 🗣️

SensUs Student Competition
Hier, à 07:00 · 🌐

Should we have listened to the warnings of experts about the possibilities of future pandemics? Dr. Janette Ramahat-Langendoen is a microbiologist from the Radb... **Afficher la suite**

Voir la traduction

June 27th, 2021

File 📄 📶 📶 📶 17:50

biosensum.udem 15 sec.

Interested in our project?

Register at www.sensus.org/workshop Online | Free participation
August 30th 2021
14:00-15:30 CET

Sensors for Influenza
How to develop sensors for rapid detection of Influenza

@sensusecompetition

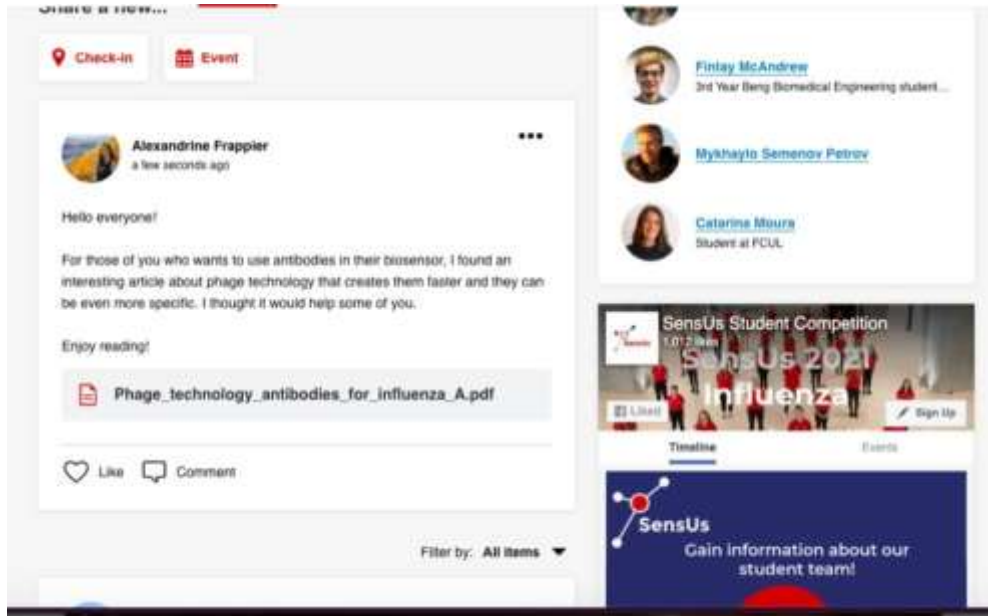
This workshop will give you an overview!

Partager sur... Promouvoir Mettre en vedette Plus

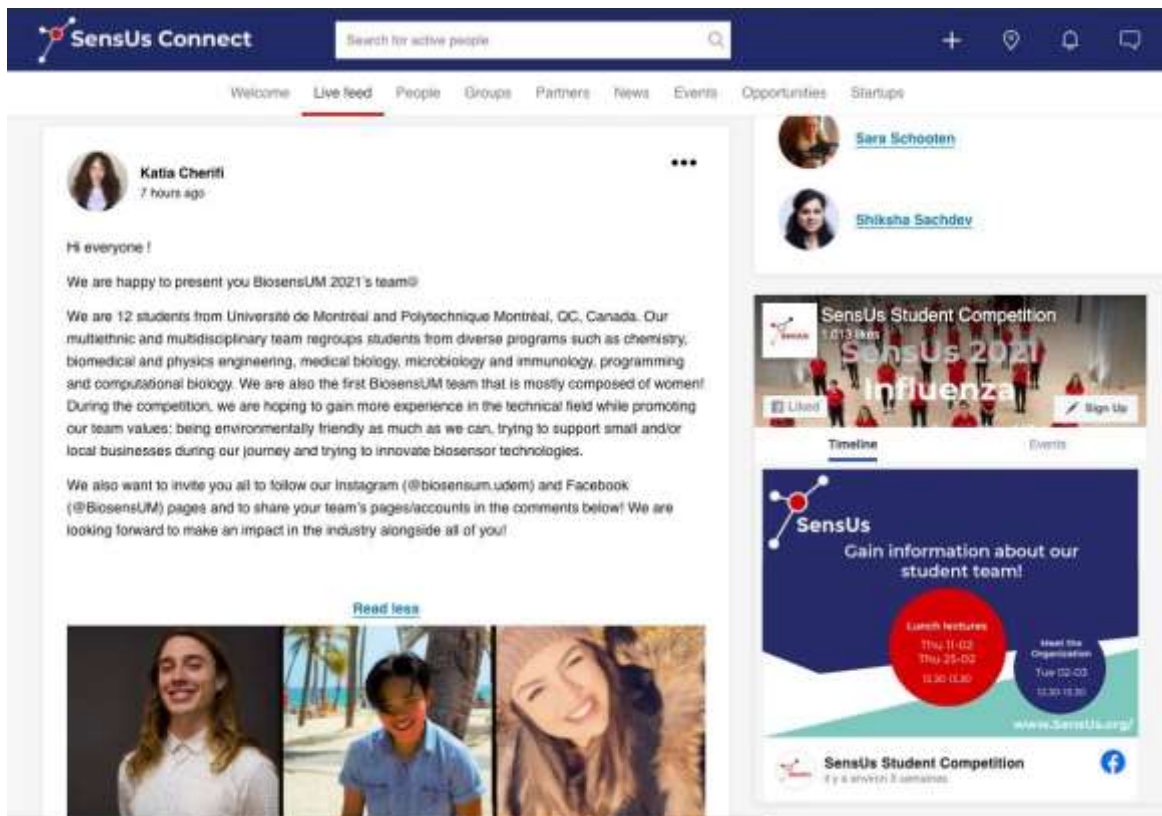
3. Gold

3.1 Post on SensUs Connect every month;

February 17th, 2021



February 28th, 2021



March 15th, 2021

SensUs Connect Search for active people

Welcome Live feed People Groups Partners News Events Opportunities Startups

Marie-Ève Ippersiel
9 hours ago

Hi everyone ! I hope you're all having an excellent day.

I found a great TED Talk about graphene, which is considered by many the material of the future. Graphene is a single layer of atoms taken from graphite. Due to its amazing electrical, optical, biological and chemical properties, it has an infinite range of real-world applications and possibilities. Two professors from the University of Manchester even won the Nobel Prize in Physics in 2010 for their research on this material.

Here's the link to the TED Talk by Mikael Fogelström : [\(4\) Graphene science | Mikael Fogelström | TEDxGöteborg - YouTube](#)

And here's an interesting article about graphene-based biosensors : [Graphene-Based Biosensors for Detection of Biomarkers \(nih.gov\)](#)

Oh, and if you feel like procrastinating, here's a fun TED Talk by Tim Urban : [\(4\) Inside the mind of a master procrastinator | Tim Urban - YouTube](#)

[Read less](#)

3 Likes

Like Comment

Upcoming events

Meet the Team
Monday, March 21 PM
[Find out more](#)

Presentation s
Tuesday, May 11, PM
[Find out more](#)

March 27th, 2021

Lucas Aubé
5 hours ago

Hi everyone!

I have found this neat article discussing how to integrate dried reagents inside a microfluidic channel and reconstituting them while minimizing unwanted dispersion.

This can be really useful for any lab-on-a-chip type biosensor! Hope it can be of use for some of you.

Here's the link : <https://doi.org/10.1038/s41586-019-1635-z>

Self-coalescing flows in microfluidics for pulse-shaped delivery of reagents
NATURE.COM

Characterization of a capillary flow phenomenon termed self-coalescence leads to the development of scalable, compact microfluidic devices that ...

Joshua Wilson
Researcher at BonicS Lab

Katia Cherifi
Microbiology and Immunology B. Sc. Student at Universit...

SensUs Student Competition
1 of 5 likes
SensUs 2021 Influenza
[Sign Up](#)

SensUs Student Competition
marproh.dorville

"I joined the Team right in the middle of Corona, but working on an Event within an interdisciplinary team is such an inspirational experience. It is one of the best things I have done during my bachelor's." Sonja Babac is part of our External Relations Department and one of our international students who joined the SensUs Organization. Her story is inspiring, encouraging, and brave! Read about Sonja's journey in the following article.
<https://www.tue.nl/.../06-03-2021-be-sure-to-join-to-a-comm...>

#TUE65

April 18th, 2021

The screenshot shows a Facebook post on the SensUs Connect page. The post is from Victoria Georges, posted a day ago. The text of the post reads: "Hi everybody! We have all been hearing the news about the Covid vaccine's link to blood clots. While there's a lot of conflicting information out there, there's still a lot we don't know. Here's a nice article from Nature laying out five important questions scientist want answers to: COVID vaccines and blood clots: five key questions". Below the text is a video thumbnail showing a person in a blue lab coat and mask handling a vial. The video title is "COVID vaccines and blood clots: five key questions". The right sidebar shows a "SensUs Student" post with 1,024 likes and a "Timeline" section with a post from SensUs Student Co.

April 28th, 2021

The screenshot shows a Facebook post on the SensUs Connect page. The post is from Kiran Shewbaran, posted a day ago. The text of the post reads: "Hey guys! Kiran here from BiosensUM :) A few weeks ago our team met up in person for the first time and it sure was way better than seeing each other on zoom. So here's our very first group photo and not just a collage like we did last time. Also enjoy our attempt at making a human tower social distancing style #CovidBonding Our semester is ending soon so we'll get to be fully concentrated on creating our biosensor Good luck on your finals if you have any and be safe <3". Below the text are two photos: one showing a group of people standing in a line in front of a building with "UNIVERSITE DE" visible, and another showing a group of people sitting on the ground in a grassy area.

May 13th, 2021

The screenshot shows the SensUs Connect website interface. At the top, there is a dark blue header with the SensUs Connect logo on the left and a search bar with the text "Search for people" on the right. Below the header is a navigation menu with the following items: Welcome, Live feed (highlighted with a red underline), People, Groups, Partners, News, and Events. The main content area features a post by Nadine Padillo, dated "4 days ago". The post includes a profile picture of a woman, the name "Nadine Padillo", and a three-dot menu icon. The text of the post reads: "Hi everyone! As the spring/summer semester begins, I'm sure we are all spending more time in the lab working on our biosensors. If you like listening to podcasts while pipetting and running assays, check out this podcast on biosensors featuring Dr. Jolly from the Wyss Institute: [Researching Biosensors with Dr. Pawan Jolly](#)". Below the text, it says "Do you guys have any scientific podcast suggestions? Comment below :)". The post has received 7 likes, indicated by a red heart icon and the text "7 Likes". At the bottom of the post, there are icons for "Like" (a red heart) and "Comment" (a speech bubble).

May 29th, 2021

The screenshot shows the SensUs Connect website interface. At the top, there is a dark blue header with the SensUs Connect logo on the left and a search bar with the text "Search for people" on the right. Below the header is a navigation menu with the following items: Welcome, Live feed (highlighted with a red underline), People, Groups, Partners, News, Events, and Opportuni. The main content area features a post by Rachel Pryce, dated "4 hours ago". The post includes a profile picture of a woman, the name "Rachel Pryce", and a three-dot menu icon. The text of the post reads: "Hi everyone, It's exciting to see everything starting to come together, and just in time for summer! I have a question for everyone, what is your favourite part of the competition so far? For me, it's been the chance to get into the lab with new people and learn new skills! I moved to Montreal (Canada) in September and SensUs has been an awesome place to meet new people." Below the text, it says "1 Like · 1 comment". To the right of the main post, there is a vertical sidebar with two profile pictures of other users and a promotional image for SensUs 1.0 with a "Liked" button. At the bottom of the sidebar, there is another SensUs logo and the text "Se ver".

June 14th, 2021

SensUs Connect Search for people

Welcome **Live feed** People Groups Partners News Events Opportunitie

R **Ryma Boudries**
18 hours ago

Hi everyone!!

Our team, BiosensUM (Canada), just made another batch of AuNPs !! Look at that ! What funny name would you give to this colour ** ! Comment it below 📌

Upcoming

SPEED MATING SOCIAL

See more

June 26th, 2021

SensUs Connect Search for people

Welcome **Live feed** People Groups Partners News Ev

J **Jeanne Peloquin**
a day ago

Hi,

I hope everyone is doing well and that all your work is leading to interesting results!!

I found an interesting and motivating article that pretty much explains why biosensors are the best way to detect h1n1 and similar viruses. The presence of hemagglutinin is responsible for respiratory symptoms of the virus but is also used by biosensors to detect the virus!

Very interesting article so I'll link it below! Have a great week :)

[Hemagglutinin gene based biosensor for early detection of swine flu \(H1N1\) infection in human - PubMed \(nih.gov\)](#)

July 13th, 2021

SensUs Connect Search for people

Welcome **Live feed** People Groups Partners News Events

Jiayi Chen
a day ago

Hi everyone !

We decided to clean up the park for earth day, let's exert ourselves together to safeguard the planet we depend on to survive !
Want to know more about us ? For those who don't follow us yet on instagram @biosensum.udem

BELATED...
BIOSENSUM

July 31st, 2021

SensUs Connect Search for people

Welcome **Live feed** People Groups Partners News Events Opportunities Startups

Alexandrine Frappier
a few seconds ago

Hello everyone!

The competition is coming closer and I'm sure you're all working hard. I just wanted to share this cool thing that happened to us.

We ordered optical equipment from Thorlabs and we got a surprise box full of healthy snacks with our order. We thought it was nice of them!

Maybe we'll include small gifts like that in our business plan, sounds like a good marketing move. What do you think?

LAB SNACKS
A Treat for Humans
THORLABS

Marina Castro Gu

Anouk Baeten

SensUs Student Com
1,023 likes
SensUs Influencer
Liked

Timeline

SensUs Student Com
vancouver
Unfortunately, the week is already captured the best of it in our vlc

3.2 World-value;

During our first team meeting in January, maybe the most important task we did as a team was determining the values that would drive forward our project and guide us during the upcoming year. By doing so, we made sure that all team members would feel that the team's direction was in accordance with their values. Guided by those values, we hoped that our biosensor would be as good for the world as it could be. We called this set of values the BiosensUM's core values:

1. The sensor, its' development, and our work in its all must **respect the human and natural environment** and look to preserve it.
2. We shall always prioritize **local and small businesses** to contribute to the development of local economy and new industries while at the same time limiting shipping to a minimum to follow our first value.
3. Our work should be driven by **innovative ideas**. Only by bringing something truly new to this world, can we have a significant impact on it.
4. Through activities and team building moments, we will cultivate a **powerful team spirit**. Good work can only be accomplished by a truly united team.
5. A simple and easy to build biosensor is both **available and responsive** when needed. In time of need, the speed at which a biosensor can be constructed and deployed around the world is crucial to control a pandemic.

These core values were approved by the whole team, our coach and our supervisor. They guided us during most of the development phase and during discussions with our professional partners. Let us now look more specifically at impacts these values had on our biosensor.

To lesser environmental footprint of the device, we choose materials that can be easily recycled and mostly electrical components that are RoHS compliant¹. The casing of our biosensor and more than 50% of the cartridges are made of HDPE, which is one of the easiest available plastics to recycle and can be recycled worldwide². This means that if many biosensors would be necessary for a year or two in case of another pandemic, the world would not be stuck with useless equipment or waste once the situation is back to normal. We also explored the possibility of reusable cartridges, but more work needs to be done to ensure the feasibility of this idea.

All our optical components were bought from Thorlabs which have a manufacture in Montreal and have their headquarters at less than a 6-hour drive from Montreal. Also, the HDPE sheets used to build the sensor were bought from a Montreal based distributor. This ensured that the heart of our sensor did not come from the other side of the world and it reduces the impact of components travel³ as well as contributing to the well-being of the local economy.

By building our sensor from easily available components from Thorlabs or other similar distributor and materials available worldwide, we ensure that our biosensor could be built rapidly all over the world to be deployed in case of a new pandemic.

Making the world safer through available, responsive and innovative medical technology without compromising the environment is BiosensUM's core value.

1. THOMAS. RoHS Compliant Definition. thomasnet certifications
https://certifications.thomasnet.com/certifications/glossary/other-certification_registration/europeancommission/rohs-compliant/.

2. Plastic Action Centre. Plastic by the number. <https://plasticactioncentre.ca/directory/plastic-by-the-numbers/>.

3. Allal, Abdelmoula Ait Mansouri, K., Youssfi, M. & Qbadou, M. Toward a Study of Environmental Impact of Shipping Industry and Proposal of Alternative Solutions. in *Advances in Intelligent Systems and Computing* (2019). doi:10.1007/978-3-030-11881-5_21.