



FGL Community

NEWSLETTER

WINTER 2022

Time flies, and with the fallen leaves on the street, winter has come.

Do you feel that you have grown a bit at the start of 2023? Looking back into 2022, have you achieved the goals you set in the past since you came to Sendai? We wish you a fresh start with renewed energy and confidence throughout the New Year.

Speaking of winter, the first thing that comes to my mind is snow. This year, though it snowed heavily on the west side of the Tohoku area, it didn't snow as much in Sendai. For those who came to Sendai last October and were excited to see the snow, you must feel disappointed. However, spring break is coming soon. You can make use of public transportation to visit other parts of the Tohoku region during your vacation. It might become one of the most precious memories in your life!

In this issue of the FGL Newsletter, as always, we include a wealth of information to help you with your studies, research, and extracurricular activities. Please enjoy the content we provide!

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ASK SENSEI

Professor AMES, Cheryl Lynn

Interviewed and written by Rawin; proofread by Sarika



Introduction from the interviewer

Howdy folks, my name is Rawin Assabumrungrat, and I am a third-year FGL student. It is a great honor for me to write the "ASK SENSEI" column for the FGL Community Newsletter. In this edition, I interview Professor Cheryl Ames, an Associate Professor in Applied Marine Biology (AMB) and a member of our university's Future Global Leadership Program. I had previously never met her before, but after contacting her via email for this interview, she promptly replied and invited me to her office. I got to learn about her wonderful experiences. For example, when the Nobel Prize winners for chemistry were announced, she was invited to Tokyo for a panel discussion with two Nobel laureates on why "Water Matters" for preserving biodiversity; indeed, she was moderating the panel with other researchers in the pantheon of science (Note: YouTube links to videos of the event are provided at the end of this article). Even though I am a mechanical engineering student, which has almost nothing to do with biology, let alone marine biology, I am entirely impressed by her personal and professional life story, and our university is very fortunate to have her as a professor. Without further ado, let's dive into her life story together.

Can you tell me about your life story?

I am originally from the east coast of Canada, from a very small island in Nova Scotia, but I was educated in the bigger city of Kingston, between Montreal and Toronto. Those are two big cities that most people know about. I have always liked science, but I also liked art. In high school, I didn't know which of the two I wanted to major in for university. Students in Canada have to take all their intended major courses during high school, so I took a lot of science and a lot of art. Then I applied to a university in my city called Queens University. I got in and studied Fine Art for a year, but I decided I really wanted to do science for my career, so I put art aside as a hobby and switched my major to Biology.

After befriending a Japanese Fine Art student at Queen's University, I became curious about Japan. So, I saved my money from part-time jobs, and in the second year, I applied for a Working-Holiday Visa (an intercountry work-and-travel program for university students) and went to Japan. I taught English while traveling around Japan, sightseeing and I did a homestay. I could also pick up some of the Japanese language and realized that I really wanted to live there longer, so I set my sights on doing my Master's in Japan.

After graduating from Queen's with my biology degree, I visited Monterey Bay Aquarium in California. When I was there, I saw an exhibit on jellyfish. That is when I fell in love with jellyfish. So I returned to Japan and was teaching English and learning Japanese, and searching for labs in

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Professor AMES, Cheryl Lynn

which to do my master's. I was invited by a lab at the University of Ryukyus in Okinawa to study box jellyfish, and I was granted a MEXT Scholarship for my studies. After I got my master's, I returned to Canada, working with fisheries and deciding my next plan. That's when I decided to do something more Canadian for a while. Since I had been educated in French as well, growing up where I did, I wanted to work bilingually (English and French). So I moved to Ottawa, the capital of Canada - a bilingual city - and there, at the University of Ottawa I completed another degree, but this one in French literature. I worked as a program officer for a Canadian science funding agency, learning behind the scenes how hard researchers work to obtain funding.

I eventually married an American (whom I met in Japan) and moved to the USA. There I started a long connection with NOAA (National Oceanic and Atmospheric Administration), first as a volunteer, then as a research assistant - going out to sea for weeks on research vessels and diving down in submarines to depths of over 500 meters exploring deep-sea coral reefs. Finally, with so many questions about marine life that I just wanted answered, I decided it was time to tackle the challenge of applying for a Ph.D. I was accepted into an amazing lab in the Biological Sciences Program at the University of Maryland and co-advised at the Smithsonian National Museum of Natural History. So I did my coursework and some research at the University of Maryland and then everything else at the Smithsonian Museum, funded by a Peter S. Buck Predoctoral Fellowship.

How did you come to this university?

While I was doing my postdoc at the Naval Research Laboratory in Washington, D.C., my host encouraged me to start looking into professor jobs in marine biology. To be honest, I wasn't initially sure that running my lab was my career goal, but I trusted my mentor's advice. Indeed, from undergrad to my postdoc days, I had been back and forth to Japan many times, as I had collaborators in Japan or came for holidays, so when I saw the job posting for AMB Associate Professor at Tohoku University, I applied right away. I was interviewed, and then I was hired a few months later, and then I started teaching at Tohoku University in June 2019. Altogether, I have lived in Japan off and on for almost a decade.

What do you do for fun, aside from working?

I like traveling since I like seeing my friends and family and visiting new places. During the pandemic, that was really hard because Japan has a lot of cool places that are easy to get to, but we were encouraged to stay inside to avoid the spread of infection. We have a lot of good places in Canada, but it can take days to get from one big city to the next. I enjoy visiting Japan and other places around the world. It is probably one of my favorite things. I like to try new foods, too. I like visiting onsen (hotsprings). There are a lot of nice onsen in Tohoku. I like to drink wine; while Japan is not really known for its wine, I have found some good wines, though. I like doing things outside, like going to the beach or on a hike, too.

ASK SENSEI

Professor AMES, Cheryl Lynn



Do you have any advice for current or prospective FGL students, especially students interested in becoming Marine Biologists?

I think if a person comes here to do their undergrad, it is probably a good idea to keep the connection and continue to do at least a master's here in Japan. Because during the four years of undergrad, you are pretty busy. By the time you get past that, it is crucial to try to publish your research, especially the research you did in the fourth year (honors thesis). So, one good way is to continue it during your master's and work on the manuscript or combine the master's findings. That is a really good way because, for example, if people want to go to the United States, Canada, Europe, the UK, or wherever, it can be a very big challenge. After all, things are done very differently everywhere. So, if the student already has independent research experience doing a master's, then I think it will be an easier transition into Ph.D. in another country or working for a company. If you have a master's, your pay jumps a little bit in North America, but not a whole lot. In Japan, for example, you may get a better job with a master's, but in North America, you generally need a Ph.D., which in the United States takes quite a long time.

You will spend a lot of years studying if you combine two years here and then five years there. But sometimes, it's possible to reduce that time by completing the research sooner and publishing it. And you're more likely to do that if you have that master's already. So stay here, if you like Tohoku University, with your advisor, or find a different advisor if you want to change the scope of your research.

Usually, you can try to find some funding, and the tuition is lower in Japan. In the United States, although tuition is expensive, it is worth it to do a Ph.D. there because if you work hard to get into a good program, you might receive full funding and/or a paid TA-ship (teaching contract), which allows you to develop valuable teaching skills for the whole five years and also receive a tuition waiver. Some very competitive schools might offer full funding even though you don't have to teach. It is always good to do a lot of research on graduate student tuition and funding opportunities before you apply to any program. Additionally, while you're in the program, you can apply for lots of different funding. Although sometimes, as an international student, it can be harder to obtain funds than a national of the country in which you choose to conduct your Ph.D. When I was pursuing my Ph.D., I could not apply for some of the American scholarships because I was not American yet. But, later on, I got US citizenship as well, so now I have dual citizenship. For students who want to become marine biologists, it is pretty much the same thing: you have to ultimately get higher level graduate research experience, but starting out as a technician is not a bad thing either.

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Since you talked about food, do you have food recommendations around Sendai?

Because of the Covid19 pandemic, I have not gone out much while living in Sendai, but I think Sendai has good ramen. There's Sendaikko (らーめん堂 仙台っ子) by Sendai Station, just across from the PARCO building. I find Nepalese food pretty tasty here too. Of course, I like other local foods like gyutan, sasakama-boko, and kaiten sushi restaurants, such as Sushi-Ro.

Also, do you have recommended places around Sendai to travel to?

It is nice to go to Yamadera (山寺, a scenic temple located in the mountains northeast of Yamagata City, next to Miyagi). You can get there by train and eat the food around there. Another choice is to go to the aquarium (Sendai Umino-Mori Aquarium). You go to the aquarium, and then you go to the outlets. You can walk to the outlet, have lunch, go shopping, and then to the onsen nearby. Additionally, there is the Kirin beer factory and the Whiskey factory if you want to take a tour. Anyway, if you have really good planning skills, you could do a lot in one day. They are at the Sendai port, which seems to have been built up recently.

For those interested in Professor Ames's talk:

Nobel Prize Dialogue Tokyo 2022 event Water Matters: Preserving Biodiversity

https://youtu.be/7ORRE004p_c

Press release by the university:

https://www.tohoku.ac.jp/en/events/special_event/nobel_prize_dialogue_2022_water_matters.html

Ways to Stay Warm in Japanese Winters!

article by Ryan

Hello everyone! As you may have guessed, the winter in Sendai is a bit on the cold side. It is weird that we have not seen that much snow this year; nevertheless, please stay warm! Although we can just wear layers upon layers of HeatTech—not to forget the puffer jacket on top—when going outside, it is not really practical when you are indoors. In this article, I will show three of the many ways people stay warm during these cold times in the comfort of your own room.

1. Portable Warmers (カイロ)

You may have seen one of these as it is basically sold everywhere! Coupled with its cheap price, it is undoubtedly one of the most popular winter items in Japan, loved by locals and foreigners alike. It comes in the form of packet that typically contains iron shavings which when exposed to air, will react with oxygen and produce iron oxide. Due to the exothermic nature of the reaction, heat is produced (sometimes up to more than 16 hours)! These little packets come in a variety of sizes and in two main forms: sticking (貼る) and non-sticking (貼らない). The sticking-type, as the name suggests, comes with a layer of adhesive tape that you can stick on a piece of clothing so you can target specific areas of the body without the need to physically carry the pouches.



2. Heating Blankets (電気毛布 ; でんきもっふ)



Feeling that your electricity bill is getting out of hand during the winter? One solution to combat this without mentally forcing yourself to just stand the cold is with electric heating blankets! These blankets are equipped with coils of heating element inside that when plugged to a power source, it generates heat quickly and efficiently, allowing you to save up on electricity when compared to using a traditional heater. These blankets come in a variety of shapes and sizes, ranging from your traditional blankets, mat-like types that are supposed to be placed under the bed sheets, to even small mats for your feet/hands when working at your desk! A lot of models also provide a controller—allowing you to adjust the heat level—and a timer. Coupled with the typically higher insulation that these blankets provide, these should definitely become a part of your winter essentials.

Ways to Stay Warm in Japanese Winters!

3. Hot Water "Bottles" (ゆたんぽ)



Want a larger and more huggable version of the カイロ? Look no further than these little gadgets. The traditional form of the yu-tampo is just a plastic bottle-like container that you're supposed to fill with hot water and either hold or place on your body to enjoy the warmth. That said, recently, innovations have been made, turning the boring shape into literal dolls! These doll yu-tampo work just like the regular ones in which you're supposed to fill in the hot water, but with the added benefit of being fluffy and coming in a range of cute designs and sizes! As such, these novel stuffed animals function not only as a regular yu-tampo, but also as a stuffed animal for you to hold or for it to just sit around and add a little decoration to your room.



On a last note, please stay warm through the winter and enjoy the cold! If you decide to go out there, please do so and enjoy the many attractions available during the winter. One of those being this temporary ice-skating rink at Mitsui Outlet Park, accessible by train.

Research Article

by Syamil Muharror A.H. (Sam)

- 4th year AMC Student

Interviewed by Dylan and Sumaya

“Amyloid aggregation under the lens of Liquid-Liquid Phase Separation”
J. Phys. Chem. Lett. 2021, 12, 368–378, <https://doi.org/10.1021/acs.jpclett.0c02567>

The world's population is aging rapidly, with more and more people living to older ages, and especially in Japan where the ratio of people over 65 years old is 29.1% — the highest in the world. As a result, the number of people diagnosed with neurodegenerative diseases such as Alzheimer's disease (AD) and Parkinson's disease (PD) is also on the rise. These diseases are characterized by the degeneration of nerve cells in the brain, leading to symptoms such as memory loss, cognitive decline, and changes in mood and behavior. These neurodegenerative diseases are caused by amyloid aggregation and recent advances suggest that the formation of these aggregates is mediated through a liquid-liquid phase separation (LLPS) process. Researchers hope that studying this phenomenon may lead to advances in finding new therapeutic strategies for AD and PD.

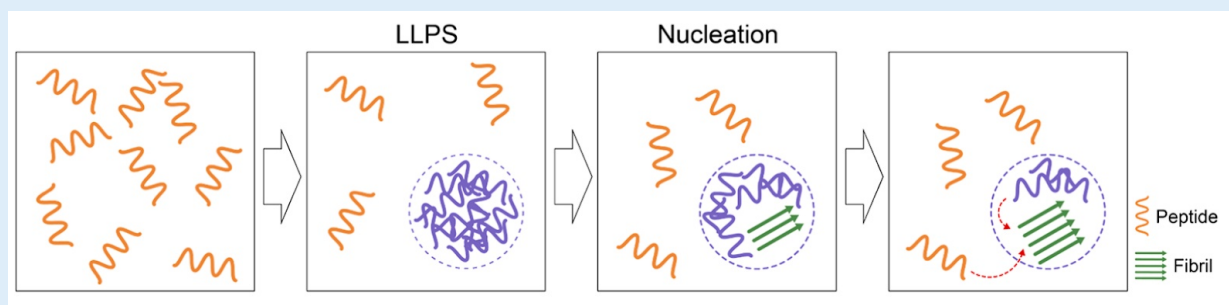


Figure 1. Schematic diagram of the amyloid aggregation mechanism through LLPS at high concentrations.

Before we go further into the topic, we need to talk about what is liquid-liquid phase separation phenomenon (LLPS). LLPS as the name suggests is a phenomenon that regulates cellular compartments via membraneless liquid condensates under high concentration that is usually formed by intrinsically disordered proteins and RNA. As you may know from biology classes, organization of space inside the cell is important for cellular processes, cellular compartmentalization ensures regions of high specialization of functions inside the cell. Nucleolus, the center within the nucleus of a cell is in fact, formed through liquid-liquid phase separation.

Increasing experiments suggest that intrinsically disordered amyloid peptides (IDPs) can undergo LLPS before the formation of amyloid fibrils. A high concentration of amyloidogenic peptides in the liquid condensates might promote the formation of toxic oligomers and increase the nucleation rates for the formation of amyloid fibrils. However, the exact role of LLPS in amyloid aggregation at the molecular level is still unknown, and the relationship between LLPS and the established aggregation nucleation theories also remains elusive.

Research Article

by Syamil Muharror A.H. (Sam)

In this article, the authors applied a coarse-grained (CG) peptide model that is claimed to be capable of capturing the general properties of amyloid aggregation to study LLPS. The CG model was successfully applied to describing the heteroaggregation of different amyloid peptides and the modulation of amyloid aggregations by chiral nanoparticles.

The CG simulations demonstrated that the nucleation of high-density liquid phase condensates or oligomers and the nucleation of fibril seeds were two different processes. The first process was analogous to the formation of droplets in the liquid phase transition. However, the oligomers did not immediately convert into fibrils, because a conformational conversion of peptides was required to form fibrils and this conformation was a high-energy state of isolated peptides. Peptides in these oligomers can cross the energy barrier and form transient beta sheets, and the nucleation of fibril seeds took place after forming beta sheets. The formation of ordered-like amyloid fibrils out of the liquid-like oligomers is analogous to the protein crystallization out of dense protein liquid. This simulation predicts that saturation of amyloid aggregation half-times with increasing peptide concentration to a constant, instead of the traditional power-law scaling to zero.

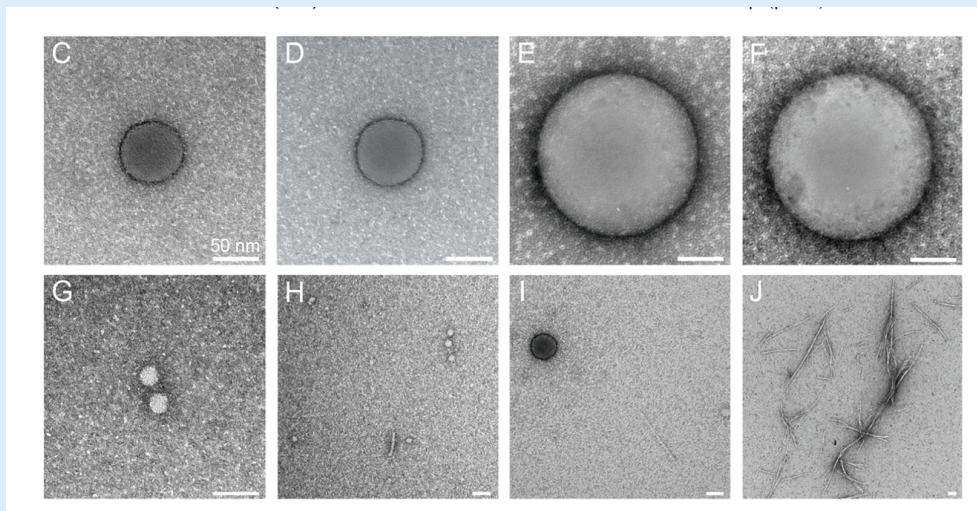


Figure 2. Thioflavin T kinetic assay and TEM imaging of islet amyloid polypeptide (IAPP) over time. (C-F) large aggregates after 15 min of incubation. (H,I) Coexistence of spherical IAPP aggregate and protofibrils after 15 min of incubation. (J) IAPP amyloid fibrils after 2 h of incubation.

They then test their predictions by performing Thioflavin T (ThT) experiments of IAPP aggregation (Figure 2). The experimental aggregation kinetics over the wide range of concentrations with different aggregation models indicated that the nucleation dominant model fits the experimental kinetics better than the nucleation/elongation model. They then test whether IAPP undergoes LLPS at high concentrations, and indeed they observed the formation of large aggregates after 15 min of incubation (Figure 2C-F), and the coexistence of droplets and protofibrils was obtained (Figure 2G-I). The ThT and TEM experiments confirmed the predictions.

Winter Festivals

Around Hokkaido in 2023

Written by Jojo and TK

Looking for something to do this upcoming break? Well, Japan is undoubtedly jam-packed with things to do and places to see during the winter season. This is especially true in Hokkaido, the northernmost prefecture in Japan, where numerous winter festivals and events are held every year. So for those of you who aren't sure what to do during the break, here is a list of some of the winter festivals you may want to check out in Hokkaido!

1. Sapporo Snow Festival/ Sapporo Yuki Matsuri

The Sapporo Yuki Matsuri is one of the largest snow festivals worldwide. This year, the festival will be held from February 4 to 11. This festival celebrates the creation of giant snow and ice sculptures, which are illuminated at night. Moreover, there will be some competitions and outdoor activities such as skating and sledding, along with live stage performances for visitors. Let's not forget the food, too! The festival would undoubtedly be packed with food vendors selling Hokkaido's winter dishes, which you wouldn't want to miss.



2. Asahikawa Winter Festival



After the Sapporo Yuki Matsuri, the Asahikawa Winter Festival is considered the second largest in Hokkaido and will be held from February 7 to February 12. This festival also involves giant snow sculptures of unique themes that change every year, an international ice sculpture competition, and various performances held on a giant stage made of snow! In the evening, the sculptures are beautifully illuminated. You can also do activities such as sliding down Japan's longest snow slide, riding on a horse-pulled sleigh, and more! Don't forget the food and drink stalls, too!

Winter Festivals

Around Hokkaido in 2023

3. Otaru Snow Light Path Festival



Held in the second week of February every year, the Otaru Snow Light Festival is a ten-day festival where visitors can enjoy walking along the Otaru Canal decorated by illuminated snow candles and sculptures. The canal's freezing surface is also decorated with glowing candles and glass floats.

4. Lake Shikotsu Ice Festival in Chitose

This festival is held between the end of January and the middle of February in the Shikotsuko Onsen, a hot spring resort. Here, everywhere you look is a wall of snow made of lake water that looks much different from those you see in the Sapporo Yuki Matsuri or the Asahikawa Winter Festival. In addition to having walls made of snow that is illuminated at night, this festival also offers fireworks, snow slides, snow tunnels, and performances.



5. The Tokachi River Swan Festival

This festival is about sightseeing of the migratory swans. Every year, thousands of swans will migrate to the Tokachi River. The locals congregate every year in order to recognize the event, which is held from Jan 27 to Feb 25, in Tokachigawa hot spring resort, Otofuke, Tokachi, Hokkaido. This year the festival is set to present its stunning trigonal pyramid shaped objects. There are numerous items, such as a light tunnel to stroll through, little snow candles, and LED animal lights, which are beautifully illuminated. Moreover, there are more events including sound of music and outdoor activities you can enjoy around!



Winter Festivals

Around Hokkaido in 2023

6. Obihiro festival



Want the festival atmosphere of Sapporo Yuki Matsuri? Another popular festival is held in Tokachi, Midorigaoka, Obihiro. There are a lot of winter activities with beautiful sights on ice statues and sculptures in various sizes. In the festival, children can sled on the snow-covered slides. The opening ceremony's fireworks show takes place in the evening, lighting up the night sky brightly. Every year, the festival is held around early February.



7. Sounkyo Ice Waterfall Festival

Sounkyo, the hot spring resort city on the eastern side of Asahikawa, Kamikawa, is known for 4 seasons and a fascinating landscape. In winter, the Sounkyo Ice Waterfall Festival takes place every year for two months,

from late January to late March. The event provides visitors with outdoor winter activities. You could spend your time simply exploring the space and take a look at snow sculptures, or you could choose to relax at the ice bar with some decent drinks. There's also fireworks at the festival. If you go there by public transport it will be very tiring. It is recommended to stay at the hotel in a hot spring resort town nearby. Moreover, you should go to the festival on the weekend to see the many stage performances held. If not then try to get there by a rental car, it will save your time. Try to visit the festival on weekends as various stage performances are held to entertain visitors.

8. Noboribetsu Onsen Hot Spring Festival



If you want a new, different festival, go to the Noboribetsu Onsen Hot spring festival. The hot water battle will be held in the freezing temperature where the participants are separated into two sides to splash water on each other. The festival is held to celebrate the sacred spring in order to yearn for good luck and good health. The festival is for 2 days in early February. There is a belief that if red teams win the hot spring temperature will increase. However, if team white wins, hot spring sources will increase in number in that year. The onsen is also known for the variety of its hot water.

Appendix

Image attribution:

1. Sapporo Snow Festival: <https://images.app.goo.gl/dMMGMwZ4hu9njHwX9>
2. Asahikawa Winter Festival: <https://images.app.goo.gl/11QZ8jBUU923fq2a7>
3. Otaru Snow Light Path Festival: <https://images.app.goo.gl/akPN9GDf6aABBEFy5>
4. Lake Shikotsu Ice Festival in Chitose: <https://images.app.goo.gl/4P1DGHLXeKGUUFbr6>
5. The Tokachi River Swan Festival: <http://www.tokachigawa.net/event/sairinka.html>
6. Obihiro Festival: <https://obihiro-icefes.com/gallery>
7. Sounkyo Ice Waterfall Festival: <https://www.japan-guide.com/blog/scott/140213.html>
8. Noboribetsu Onsen Hot Spring Festival: <https://takimotokan.co.jp/en/news/noboribetsu-onsen-hot-spring-festival-report/>



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