

# International Webinar on Gels and Networks



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## Controlling phase separation with polymer networks

**ABSTRACT:** Nature has incredible control of phase separation. As a good example, some birds use phase separation to make feathers with vibrant blue colors that arise because they contain highly monodisperse, densely packed air bubbles that have a size around the wavelength of light. The birds must have exquisite control over the size of these bubbles, as even a 10nm change in their diameter will cause the color to change. However, replicating such a process in the lab is extremely difficult, as we must contend with factors such as coalescing of domains and Ostwald ripening, which result in polydisperse materials.

I will explain how performing phase separation inside of gels, or inside of glassy polymer networks, gives us much better control over the phase separation process. This allows us to create large pieces of material with uniform color by phase separating simple components – i.e. without the need for any dye molecules. I will also show how we can also control when and where phase separation occurs by tuning the mechanical properties of the polymer network, and talk about how this is relevant to protein phase separation inside living cells.

### **GOALS:**

- Understand how Nature uses phase separation to create color and other properties, and why this is hard to mimic in the lab
- Explore how to control aspects of phase separation with a confining polymer network
- Learn how we can use this to make materials with finely controlled properties

### **ABOUT THE WEBINAR:**

Due to the ongoing global crisis involving COVID-19, there is little chance for the soft matter community to meet to learn about gels and networks. We propose this seminar as a way for members of the European and Asian communities to share our research and learn from each other, even when social distancing is necessary. The tone of this webinar is informal, and questions can be freely asked at any time. We welcome open discussion, and hope that all who attend will learn a lot!

**Webinar website:** <http://www.fp.a.u-tokyo.ac.jp/lab/sozai/seminar.html>

### **Registration:**

[https://u-tokyo-ac-jp.zoom.us/meeting/register/tZ0vce-urT4jHtG7h\\_YNQfiZmMYINhdq8L1V](https://u-tokyo-ac-jp.zoom.us/meeting/register/tZ0vce-urT4jHtG7h_YNQfiZmMYINhdq8L1V)

**Date:** Thursday, July 8<sup>th</sup>, 2021

**Time:** 17:00-18:30 JST, 10:00-11:30 CET

**Cost:** Free

### **Organizers:**

Daniel King (Hokkaido University)

Koichi Mayumi (University of Tokyo)

Tetsuo Yamaguchi (University of Tokyo)

Tetsuharu Narita (ESPCI Paris)