

DISTINGUISHED  
STAFF FELLOWS  
AT ORNL



# Alice Perrin

*Alvin M. Weinberg Fellow*

## **Where and when did you earn your PhD?**

I earned my PhD at Carnegie Mellon University in 2019.

## **What was the subject of your dissertation?**

My dissertation focused on the characterization of high-entropy alloys for magnetocaloric applications

## **What was your dissertation's major contribution to your field?**

I developed the first high-entropy alloy studied for magnetocaloric applications, demonstrating that the distribution of magnetic exchange interactions caused by the spread of dissimilar atoms on a single lattice broadened the magnetocaloric response favorably.

## **Who is your ORNL mentor and where are you working on campus?**

My mentor is Ying Yang in the Microstructural Evolution Modeling Group. I am working in the Microstructural Evolution Modeling Group in the Materials Science and Technology Division.

## **What will your fellowship research focus on?**

The overarching goal of my project is to analyze and understand the phase transformations and phase instability induced by irradiation in grain boundary-segregating binary alloys, which are alloys designed such that the solute within the system preferentially segregates to grain boundaries and stabilizes the grain size. I will assess whether solute segregation as a thermal equilibrium structure provides any advantageous radiation tolerance and resistance to irradiation effects such as hardening and embrittlement.

## What is your project's expected contribution to your field?

This research will broaden our understanding of radiation-induced segregation, and it will potentially open up a new avenue of design for radiation-tolerant materials.

## What are your research interests?

My research interests include nonequilibrium processing, thermodynamic and kinetic stabilization of metallic microstructures, functional alloy design for radiation resistance and electrical and magnetic properties. I also enjoy exploring additive manufacturing and high-entropy alloys.

## What led you to science and your specific discipline?

My amazing high school AP physics teacher helped me fall in love with physics, and she encouraged me to pursue it in college. As a physics undergrad, I realized the research I was drawn to was all under the umbrella of materials science and switched fields for graduate school. I've worked on all kinds of functional and structural alloys research since then.

## What did you do before coming to ORNL?

I was a postdoc in Chris Schuh's group at MIT from September 2019 to April 2021 working on developing nanocrystalline nickel alloys designed for accelerated sintering, which would make them useful for specialized additive manufacturing applications.

## Could you share an interesting fact or two about yourself?

I've fostered both dogs and cats since graduate school, and my dog was my first "foster fail." That means I loved fostering him so much I ended up adopting him! I really enjoy rock climbing, and my partner and I are in the process of building a bouldering cave in our basement.

## What nonscience topic or activity is important to you and why?

I have a keen interest in plant-based eating for ethical, environmental, and health reasons. I could talk for hours about agricultural land use, food deserts, and animal ethics. I'm passionate enough about beans and legumes that I actually have a lentil plant tattooed on my shoulder.

