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[Gerontology \(../gerontology/index.html\)](#)

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[History \(../history/index.html\)](#)

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[International Studies \(../international-studies/index.html\)](#)

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[Philosophy \(../philosophy/index.html\)](#)

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[Psychology \(../psychology/index.html\)](#)

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[Family Science and Social Work \(../family-science-and-social-work/index.html\)](#)

---

[Graduate Writing in Gerontology \(../graduate-writing-gerontology/index.html\)](#)

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[Teacher Education \(../teacher-ed/index.html\)](#)

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[Art History \(../art-history/index.html\)](#)

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[Music \(../music/index.html\)](#)

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[HCWE Writing Scholar In Residence \(../lockridge-writing-scholar-in-residence/index.html\)](#)

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[Economics \(../economics/index.html\)](#)

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[Innovating Disciplinary Writing Assignments \(../innovating-disciplinary-writing/index.html\)](#)

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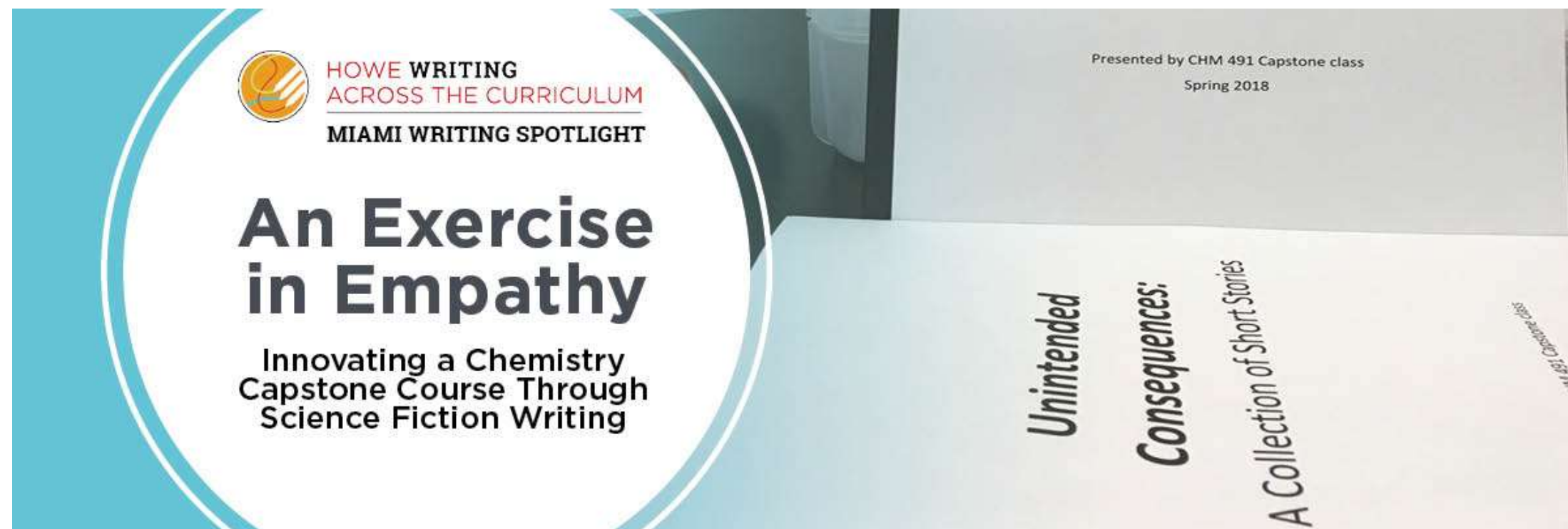
[Writing Instruction in Engineering \(../sidebottom-writing-instruction-engineering/index.html\)](#)

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[Chemistry \(index.html\)](#)

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## An Exercise in Empathy: Innovating a Chemistry Capstone Course through Science Fiction Writing



by Caitlin Martin & Will Chesher  
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Heeyoung Tai (<https://www.miamioh.edu/cas/academics/departments/chemistry-biochemistry/about/faculty-staff/faculty/tai/index.html>), a teaching professor in the department of chemistry and biochemistry, wants to help her students become critical thinkers and ethical decision makers. Students are going to graduate, she said, and “have to make many different decisions, not only as [people] but as community leader[s].”

Her students are effective at communicating their knowledge of science to an audience of experts in more traditional genres like lab reports and poster presentations, she said. But after graduation, students will also need to communicate to non-expert audiences as they make and communicate these decisions.

Tai decided to incorporate fiction writing into her spring 2018 and spring 2021 capstone courses to provide an opportunity for students to integrate liberal learning and specialized knowledge, a feature of Miami’s capstone courses (<https://miamioh.edu/liberal-ed/current-students/senior-capstone/index.html>).

Tai explained that fiction writing has begun to appear in *Nature*, a multidisciplinary science journal, and that she thought fiction was an appropriate vehicle for students to “expand their perspectives,” especially around controversial topics.

In other courses, Tai discusses topics like new genome editing techniques that might impact human life. “But these courses . . . did not give us enough time and space for such in-depth discussion.” In these courses, she introduces multiple perspectives on a given topic, but said that students had not had the opportunity to engage in a process of “informed reflection” through which students “explore ethical implications and expand their perspectives.”

Her approach to teaching a capstone course called Chemistry and Societal Issues (CHM 491) gives students that opportunity. Through a carefully scaffolded project, students in the course read and analyze science fiction texts before writing their own. The goal is to explore the ethical consequences of scientific research and decision-making. At the end of the spring 2018 semester, Tai compiled all student essays into the collection *Unintended Consequences: A Collection of Short Stories* ([https://drive.google.com/file/d/1HOtasJg6pmX2wOpqGUUQaT2GQV8Ja\\_fw/view](https://drive.google.com/file/d/1HOtasJg6pmX2wOpqGUUQaT2GQV8Ja_fw/view)).



## Collaborating to Teach Science Fiction Writing

To develop this interdisciplinary assignment, Tai collaborated with members of Miami's English department, including **Cathy Wagner**, a creative writing professor in the English Department, and **Justin Chandler**, a PhD candidate in literature.

Tai explained that she wanted to incorporate creative writing into her course, "but I had no idea how to write such things." She reached out to Wagner, who was directing the creative writing program at the time.

The capstone course assignment "seemed like this. . .really terrific way to fulfill our mission as a liberal arts university" and "to get [students] to think about ways of imaginatively applying scientific knowledge to real world problems," Wagner said.

"When you write with characters," she continued, "you have to fling yourself into the consciousness of that character." That allows you to view problems, including those "that might have formerly seemed quite abstract," to "suddenly come into view" as the writer "think[s] about what decisions a person would have to make under particular circumstances."

Wagner also put Tai in contact with Chandler, who also has an MFA in Creative Writing. He was excited by the opportunity to guest teach in Tai's course to introduce students to principles of fiction writing.

"Fiction is an exercise in empathy and stepping away from your normal experience," Chandler said. Reading and writing science fiction can help individuals think about "what happens to the people who are left out of this experience," he said.

To scaffold this assignment, Tai has students read one of several selected science fiction texts, like Margaret Atwood's *Oryx and Crake* or Kazuo Ishiguro's *Never Let Me Go*. She asks them to analyze the book by identifying the scientific practice or theory in the story and the way it affects the society. Students must also identify intended benefits and unintended consequences. They also write a reflection connecting the story to an existing ethical issue in scientific practice in society.

Tai also makes clear how students should engage with these texts for the course. She asks them to pay attention to what happened and how the discipline can "go wrong." Tai prepares students to read and analyze scientific texts in ways that support their learning in the course. "In a way, I'm limiting the way they reading and the watching experience they can have" when engaging similar texts outside of class, she said.

In addition, Tai has creative writing graduate students and faculty as guests in the course. In the spring 2021 capstone, both Chandler and assistant professor Jody Bates have helped Tai teach this assignment. By having guest teachers, Tai is able to introduce students to experts in creative writing and embrace her own position as someone learning to write science fiction, too.

## Learning with Students

Tai's collaboration with creative writers at Miami has helped her support student learning in creative, interdisciplinary ways. She also has been writing alongside her students throughout this process, something that she said has encouraged her to be vulnerable with her students.

Tai said she did not get to finish her own story before sharing it with students. "I know this is not a perfect story," she told her class, but "these are the story elements you should have." She said she does it to provide an example for students who are also trying to write in a new genre that they may not have encountered before.

When Chandler Zoomed in to teach the basics of fiction writing in Spring 2021, Tai participated in the activities alongside her students. One of Chandler's activities involved having students add concrete details to the sentence *I ate a peanut butter and jelly sandwich*. Adding concrete details to simple, declarative sentences can make them more meaningful, he explained.

One of the students wrote "a really scary story out of peanut butter and jelly," Tai explained. The details made it feel like "something is watching you." When the class ran out of time for everyone to share their revisions, Tai asked students to post them to an online discussion board to continue the conversation.

This practice of sharing and being vulnerable with students in her capstone course has led to Tai sharing her experience with students in other classes, too. "When I talk to students," she said, "I tend to talk about my challenges, also."

**“Fiction is an exercise in empathy and stepping away from your normal experience.”**

“When I talk to students, I tend to talk about my challenges, also.

Tai’s work to develop this writing project has led to a continued partnership with members of Miami’s Creative Writing Program as she teaches this assignment for a second time. She also received a Special Recognition for a Transformative Writing Project in the 2021 Howe Award for Excellence in Disciplinary Writing Instruction.

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*Have you been innovating writing and its teaching in your classroom or program? Read about the [Roger & Joyce Howe Award for Excellence in Disciplinary Writing](#) ([../howe-award/index.html](#)). Nominations for the 2022 edition of the award will open in the Fall.*

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