

# Staebler Insurance OER Fellows Grant Application

## Instructions

Please answer the below questions and upload your completed document to the [web form](#). The web form will be open from Monday, November 6, 2023 to Sunday, February 4, 2024. Remember that you must also submit a budget and timeline for your project using the templates provided. See the grant guidelines [How to Apply section](#) for more information.

## Project Information

1. Project title: **Cellular and Molecular Biology** images for teaching sequential course to students studying in multiple areas of the Biological sciences.
2. Provide the names and roles of project team members, if any.

Laura Lemieux, Continuing Lecturer, Department of Biology, University of Waterloo (Primary Investigator & Content Expert)

Vivian Dayeh, Continuing Lecturer, Department of Biology, University of Waterloo (Co-Investigator & Content Expert)

3. Provide a one paragraph description of the OER project. Explain why this project is especially appropriate for this course/program and what change(s) will be made to tailor the OER to the course/program more directly.

The aim of this project is to produce high-quality educational images of cellular and molecular biology processes that can be freely shared, modified, and utilized in several courses at the University of Waterloo and at other Ontario Universities. The curriculum in the areas of cell and molecular biology at Waterloo is currently disjointed in its use of commercial resources (published textbooks). To foster greater connectivity and enhance the overall educational experience, it is imperative to develop image resources that can be used across multiple courses within the cell and molecular biology curriculum. Many students take these courses from their first to their third year of undergraduate study and the use of this bank of fundamental images will aid in their learning. Both the instructors and the students in these courses will benefit from this holistic approach to the curriculum.

4. What type of OER are you developing?
  - Design and create original resource(s)
  - Adapt existing resource(s)
  - Other. Please describe:
5. What form will this OER take and where will it reside? i.e. how will the OER be made accessible to others to adopt and adapt? For example, will you share your project in the [eCampusOntario Pressbooks library](#), on [OER Commons](#), on a publicly available website, etc.

The Cellular and Molecular Biology OER will be available in the University of Waterloo “Open Waterloo” OER website as a downloadable image bank with descriptive text. This will add onto the biological resources that are currently underrepresented and they could also be adapted for use by many faculty as these resources would have interdisciplinary appeal.

6. Which Creative Commons or open license will you assign to the completed project? You can use the [Creative Commons license chooser](#) for help.

The images created as a part of this project will be made available as open resources with a Creative Commons license of CC-BY-NC-SA. This would allow other instructors to openly use the images in their course instruction with the capability of making modifications as needed and ensure that the images will not to be used for commercial purposes.

7. Provide an outline of the content (high-level content map) of the proposed OER. Describe any ancillary resources or supplementary material you plan to create (e.g. interactive quizzes, videos, question banks, slides, etc.).

This OER grant funding will be used to produce the essential Cellular and Molecular Biology images needed for both online and in-person instruction of a large number of courses with the primary focus on BIOL 130 and BIOL 235. This project will focus on creating accurate images that extend the limited number of OER images that are currently available. The current OER in this field is extremely limited. Several institutions would be able to use the accurate images created in this project and reduce the cost of instruction for their students.

8. Are there other OERs available that cover the same learning objectives as your proposal? If so, explain in 3-4 sentences why you’ve elected not to adopt or adapt them.

An examination of the OER that is currently available has been done. Overall, there are fewer OER textbook materials available for molecular biology as there are for cell biology and these resources’ accompanying visuals are frequently overly simple in their illustration, making it difficult to use them for lab and lecture course instruction. A new course, Biol 235, will act as a link to third-year molecular biology courses, while Biol 130, a foundational course, will undergo a curriculum revision to incorporate OER into its instruction.

## Course Information

1. Provide the course code and title that will use the OER.  
BIOL 130 - Introductory Cell Biology  
BIOL 235 - Foundations of Molecular Biology
2. Provide the typical class size and/or number of sections.  
BIOL 130 – Fall term = 1400 students; Winter term = 350 students (total yearly enrolment of 1700-1800 students)  
BIOL 235 – Fall term = 120 students; Winter term = 120 students; Spring term = 120 students (total yearly enrolment of 360 students)

3. How often is the course offered?

Both BIOL 130 and BIOL 235 will be offered in Fall, Winter, and Spring terms

4. What resource(s) does the course typically use? (choose all that apply)

- Required commercial textbook
- Required open textbook
- Required course pack
- Other. Please describe: This is a new course

5. What is the approximate cost of the above required resource(s)?

For Biol130- the commercial textbook (electronic) costs \$97.50

For Biol 235 this is a new course and all material would be created and placed online for lectures and labs.

6. Will the creation of this OER reduce student costs for your course?

Yes, and it will promote consistency between images used in sequential courses where content is being coordinated to benefit student learning. BIOL 130 would be able to move to an OER textbook if accurate images that would be created in this project. This would significantly reduce the cost for a substantial number of students in the Faculty of Science and the Faculty of Health.

7. Are there any other Waterloo courses that might use the OER? If yes, please list the Waterloo courses that might use the OER.

BIOL 239 – Genetics (enrolment of 1,200 students/year)

BIOL 335L – Molecular Biology Techniques (enrolment of 80 students/year)

BIOL 331 – Advanced Cell Biology (enrolment of 120 students/year)

BIOL 342 – Molecular Biotechnology 1 (enrolment of 100 students/year)

BIOL 431 – Bacterial Molecular Genetics (enrolment of 60 students/year)

BIOL 432 - Molecular Biotechnology 2 (enrolment of 80 students/year)

BIOL 433 - Plant Biotechnology (enrolment of 35 students/year)

BIOL 434 – Human Molecular Genetics (enrolment of 100 students/year)

BIOL 483 – Animal Cell Biotechnology (enrolment of 40 students/year)

8. Do you know of similar courses at other institutions that might use the OER? If yes, please list the courses at other institutions that might use the OER.

The images created for this project could be useful for introductory cell biology and molecular biology courses at other universities that often have sizable student enrolments. Examples include BIO130 (Molecular and Cell Biology) at the University of Toronto and BIOL 1090 (Introduction to Molecular and Cellular Biology) at the University of Guelph.

### Project Impact

1. Describe the impact of your project, if any, on your students, you as an instructor, your department, your discipline, or the University.

The understanding of complex cellular and molecular processes is challenging with the currently available OER textbooks, and the images created in this project will increase both effective teaching and student learning within this discipline. The impact of this project will be to provide images to use for teaching without the cost of a textbook in courses that incorporate cellular and molecular biological applications as a critical element of their content. When combined with OER textbook materials or instructor-developed course notes, the utilization of OER images created in this project will significantly reduce the cost of instructional resources to a very large number of students in several faculties at UW.

### Plan for Project Success

1. In 3-4 sentences, describe how you plan to measure the impact of the project, including, but not limited to, student learning experience/feedback?

In addition to surveys directed at students we will be working with many faculty in our university and others to share these resources and create a network of people sharing these resources. We will be reaching out to faculty within our department, the university, and other universities to survey the impact that sharing these resources has had on their ability to prepare to teach effective cellular and molecular biology courses.

2. In 3-4 sentences, describe your maintenance plan. How will the OER be regularly reviewed and revised? What is your plan for updating the OER and keeping it openly available online?

The images created in this project will include those that are fundamental to cellular and molecular biology. Students will be able to provide feedback during the creation of the images to ensure the most effective illustrations for both teaching and learning are created. The most effective way to keep the images publicly accessible will be to make them available online via the Faculty of Science OER website.

3. Is there any other information you would like to share?

We are very excited to have the opportunity to create these sharable images while remapping our undergraduate curriculum for cell and molecular biology. We are anticipating the creation of a second year cell biology course that will integrate into this remapped material.

# Grant Timeline

Item	Project Stage	Stage Detail	Who is Responsible	Target Timeline	Additional information
1	Initial	Priority list of images	L. Lemieux and V. Dayeh	4-6 weeks	Delivery date 06/14/2024
2	Initial	Student artist (s) hired	V. Dayeh	2-3 weeks	Delivery date 07/05/2024
3	Stage 1	Completion of first set of 20-25 image	Student artist(s)	4 weeks	Delivery date 09/02/2024
4	Stage 2	Completion of second set of 20-25 ima	Student artist(s)	4 weeks	Delivery date 10/03/2024
5	Stage 3	Student feedback of image sets created	L. Lemieux and V. Dayeh	6-8 weeks	Delivery date 02/28/2024
6	Stage 3	Faculty feedback of images created	L. Lemieux and V. Dayeh	6-8 weeks	Delivery date 02/28/2024
7	Stage 4	Refine image assets	Student artist(s)	2-3 weeks	Delivery date 03/30/2024
8	Stage 5	Publish online for open access to image assets	L. Lemieux and V. Dayeh	2 weeks	Delivery date 04/22/2025

# Grant Expenses (Example)

Item	Expense Name	Expense Detail	Cost Breakdown	Total Expense (CAD)	Additional information
EXAMPLE	[Name of tool] OR [Name of person] OR [unnamed type of person], credentials, service	What is the purpose of this service, tool, or person?	How much per hour? How many hours (estimate)? How long will this service be needed?	Amount per hour X hours	Any other information you can provide to justify the need of person hired or choice of tool
Images	Production of set of 40-50 image assets by student	Students will make high quality images are used to support the lectures on online activities in Biol130 and Biol235	\$100-125/image X 40-50 images (approximately 4-6	5000.00	Ideally we will hire student artists. This has already worked in previous projects on image creation.