Affordable Materials Grants, Round 20:

Continuous Improvement Grants

(Fall 2021-Fall 2022)

Proposal Form and Narrative

# Notes

* The proposal form and narrative .docx file is for offline drafting and for our review processes. Submitters must use the online Google Form for proposal submission, including uploading this document.
* The only way to submit the official proposal is through the Google Form. The link to the online application is on the [Round 20 RFP Page](https://www.affordablelearninggeorgia.org/about/rfp_r20).
* The italic text provided below is meant for clarifications and can be deleted.

The Round 20 Kickoff will include an asynchronous training module, required for all team members to complete, followed by the synchronous Kickoff Meeting on December 10, 2021 from 1pm-4pm. At least two team members from each awarded team (unless the award is for one individual) are required to attend the synchronous Kickoff Meeting.

# Applicant and Team Information

*The* ***applicant*** *is the proposed Project Lead for the grant project. The* ***submitter*** *is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant—if so, just leave the submitter blank.*

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| --- | --- |
| Requested information | Answer |
| Institution | Clayton State University |
| Applicant name | Dmitriy Beznosko |
| Applicant email | [dmitriybeznosko@clayton.edu](mailto:dmitriybeznosko@clayton.edu) |
| Applicant position/title | Assistant Professor |
| Submitter name |  |
| Submitter email |  |
| Submitter position/title |  |

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

|  |  |  |
| --- | --- | --- |
| Team member | Name | Email address |
| Team member 1 | Dmitriy Beznosko | [dmitriybeznosko@clayton.edu](mailto:dmitriybeznosko@clayton.edu) |
| Team member 2 | Tatiana Krivosheev | [tatianakrivosheev@clayton.edu](mailto:tatianakrivosheev@clayton.edu) |
| Team member 3 |  |  |
| Team member 4 |  |  |
| Team member 5 |  |  |

If you have any more team members to add, please enter their names and email addresses in the text box below.

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# Project Information

| Requested information | Answer |
| --- | --- |
| Type of Project | * *Revision of open educational resources (OER) used in existing courses* * ***Creation of ancillaries for existing OER courses*** * *Replacement of current OER in courses with new/better OER* * *Other* |
| Requested Amount of Funding  *$10,000 maximum total award per grant* |  |
| Course Titles and Course Numbers | PHYS 2211L (Principles of Physics I Laboratory)  PHYS 2211L (Principles of Physics II Laboratory) |
| Final Semester of Project | * *Fall 2022* |
| Currently Existing Resource(s) to be Revised/Ancillaries Created  *Please provide a title and web address (URL) to each of the currently existing resources that you are revising, creating new ancillary materials for, or replacing. If replacing, please include a title and web address (URL) to the new OER as well.* | Current lab manual to be re-done:  <https://github.com/Tatiana-Krivosheev/Old-Laboratory-Manuals>  Current lab videos to be redone: <https://www.youtube.com/playlist?list=PLra9sbnMdYHNlmdDYVLllDak7aDQH-4IK> |

# Project Goals

*In at least one paragraph, describe your project’s goals and what materials will be created or revised.*

Motivation and justification:

Following the transformation of the PHYS2211/PHYS2212 course sequence, it is imperative to update the associated laboratory course (PHYS2211L/PHYS2212L) to match the new topics progression and the material level in the adopted OpenStax “University Physics” textbook. Recent upgrade in lab equipment also needs to be included.

During the Fall 2020 semester, as COVID19 limitations required us to reduce student numbers per each laboratory sessions to a half of the usual occupancy, we introduced the in-home experiment on alternative weeks for a total of 6 mechanics experiments. These included quickly created videos of the experiments that students would analyze using Tracker software and supplemental instructions to modify existing lab to this format. These experiments were well received by the students as evident by the conducted survey, and the accuracy of the collected data was typically higher than for the same experiments done in class. Because of that, we would like to both make the high-quality videos and update the appropriate manuals for the first semester lab as well as to expand this idea to the second semester. We have tested this idea for the magnetic force and the e/m ratio experiments.

Therefore, additional goals for this project would be creation of the high-quality set of the videos of mechanics experiments using the high frame rate camera (up to 960 frames per second; the camera is funded by CSU College of Arts & Sciences Minigrant), update all manuals and introduce this in-home lab approach to select experiments for the second semester physics labs. The high frame rate is important to keep the moving objects sharp so that they can be accurately tracked in the video, and to provide additional data points for the analysis of fast and short-ranged processes, such as magnetic force lab and similar).

The materials from PHYS2211L/PHYS2212L courses are also used for the algebra based PHYS1111L/PHYS1112L laboratories with reduced requirements.

Project goals:

1. Update/re-write lab manuals to align with the newly adopted textbook and to include the updated lab equipment and to cover the Tracker-based video labs. The revision will apply to both semesters for a total of 24 experiments.
2. Create a set of high-quality videos using the updated equipment and the new high frame rate video camera for mechanics lab (PHYS2211L, PHYS1111L) – at least 6 videos.
3. Identify the experiments in PHYS2212L/PHYS1112L that will benefit from the video + Tracker approach and create a set of high-quality videos for these experiments (currently, at least 2).

Comments:

Note that the link with currently existing old videos doesn’t contain files that had security or other issues with being put into public access. The newly produced videos will be all public accessible.

The further description of the new textbook adoption, the in-home labs and the survey details can be found in PoS(ICRC2021)1363 publication (available at <https://pos.sissa.it/395/1363/pdf> )

All videos created as projects for PHYS courses can be found at: <https://www.youtube.com/playlist?list=PLra9sbnMdYHMdOUxDbi5DjehX1LopVfZH>

# Action Plan

*Describe the tasks needed to complete the project in as much detail as possible. If this application has more than one team member, include the major roles for each person and which tasks this role is assigned. Estimate the amount of time (e.g. number of hours) each task will take. Include plans for open licensing and plans for making your materials accessible. Indicate if you are using other platforms in addition to the repository to host your created materials.*

The start of the project in January 2022 will be a meeting of the whole team to finalize the list of all tasks that need to be done, such as the new manuals and videos. The list of the experiments (main and possible backups) for each semester will be set and tasks for each experiment will be written down.

Dr. Beznosko will be writing the text-based lab manuals and supplementary materials such as example plots and tables for all labs.

Dr. Krivosheev will be creating video instructions for all in-home labs to supplement the text-based manuals.

A student assistant under the supervision and with active participation of Beznosko and Krivosheev will do the video shoots for each in-home experiment outlined in the list of tasks.

External collaborator in close contact with Beznosko and Krivosheev will process these videos to be best compatible with Tracker software, and will develop an online tool to help students carry out these in-home projects

Beznosko and Krivosheev will develop metrics for a student satisfaction survey to measure success of the updated course materials.

In addition to all newly created materials being available via Affordable Learning Georgia hosting, the video materials will be also available for public through YouTube channels for the courses and the developed software will be shared via GitHub.

The description of this approach to labs and the materials availability will be disseminated via public presentation(s) at large national or international conferences, schedule and situation permitting. The material resulting from both the course transformation work (round 18) and this continuous development (round 20) will be presented together in each case as they naturally competent each other. The results for the round 18 transformation grant 561 were already presented at large international science conference ICRC2021 (PoS(ICRC2021)1363 publication, <https://pos.sissa.it/395/1363/pdf> )), at AAPT summer national meeting, at SACS AAPT spring 2021 regional meeting (preliminary) and another presentation just got accepted for the Teaching Matters spring 2022 conference (<https://www.gordonstate.edu/academics/academic-affairs/cetl/teachingmatters/index.html>) to show the results of transformation grant and the preliminary results from this continuous transformation grant if awarded.

# Timeline

*Provide a project timeline aligned with the action plan above. Include major milestones and deadlines, keeping in mind your selected Final Semester.*

Spring 20222 semester

* The team gets together to write down the list of tasks and a list of experiments
* The video material production for PHYS2211L/PHYS1111L experiments
* Rewriting of the manuals for the PHYS2211L/PHYS1111L experiments
* Develop the student satisfaction survey with new materials
* By semester end, all videos, and other materials for PHYS2211L/PHYS1111L are completed
* Semester status report.

Summer 2022 semester

* The materials developed over Spring semester are used to teach PHYS2211L/PHYS1111L (either both or whichever one will be offered in the summer)
* As needed, materials are corrected based on the in-class experience
* Student satisfaction survey is deployed at semester end.
* The video material production for PHYS2212L/PHYS1112L experiments
* Rewriting of the manuals for the PHYS2212L/PHYS1112L experiments
* By semester end, all videos, and other materials for PHYS2212L/PHYS1112L are completed
* Semester status report.

Fall 2022 semester

* The PHYS2211L/PHYS1111L and PHYS2212L/PHYS1112L are fully deployed.
* If needed, materials are corrected based on the in-class experience.
* All development is completed.
* Student satisfaction survey is deployed at semester end.
* All materials are placed in public access
* Final report.

Sustainability: A current plan is to keep the video-based in-home labs format after the pandemic as this allows to increase number of students in the class without purchasing additional equipment or moving to larger lab facilities.

# Budget

*Please enter your project’s budget below. Include personnel and projected expenses, keeping in mind that this grant funds the estimated time in your Action Plan. The maximum amounts for the award are as follows:*

* *$2,000 maximum per team member for salary, course release, travel, etc.*
* *Additional project expenses allowed, but must be adequately justified in this section*
* *$10,000 maximum total award per grant*
* Dr. Beznosko will develop the text-based lab manuals and supplemental materials as well as supervise video and the online projects for in-home labs and participate in the student satisfaction survey creation and implementation. Stipend $2000.
* Dr. Krivosheev will develop all video-based manuals and instructions to in-home labs, as well as supervise video and online tool projects for in-home labs and participate in the student satisfaction survey creation and implementation. Stipend $2000.
* External collaborator A. Iakovlev will assist with making the videos and process them to meet the compatibility standards of the Tracker program and develop the online tool assisting students in proceeding the videos, with continued development and support throughout the project in close collaboration with D. Beznosko T. Krivosheev. $20/h, 10h/week for video editing + active development for 4+4 weeks spring semester, and 1h/week of continued development and support during 8 weeks of summer 2022 and 12 weeks of fall 2022 semester – total: $2000
* A student assistant will create video materials with support by A. Iakovlev and under the supervision of D. Beznosko and T. Krivosheev. $10/h, 10h/week for 20 weeks to be split between spring and summer 2021 (or summer and fall) to include production of videos for both PHYS2211L and PHYS2212L, additional videos for backup experiments and the time for any possible corrections/re-shoots/fixes/additions/alterations as well as checking of the newly produced manuals. Total per student assistant: $2000
* Participation in AAPT/APS/Open Education conference 2022, or similar conference for 2 - $1564. This is assuming in-person participation. If online – participation in more than one conference is planned.

# Creative Commons Terms

*I understand that any new materials or revisions created with Affordable Learning Georgia funding will, by default, be made available to the public under a Creative Commons Attribution License (CC-BY), with exceptions for modifications of pre-existing resources with a more restrictive license.*

# Accessibility Terms

*I understand that any new materials or revisions created with Affordable Learning Georgia funding must be developed in compliance with the specific accessibility standards defined in the Request for Proposals.*

# Letter of Support

*The Department Chair from the corresponding project, or the Department Chair’s direct report such as the Dean or Provost, must provide a signed Letter of Support for the project. This letter should acknowledge the following:*

* *The department will provide support for fund disbursement in correspondence with the Grants/Business Office.*
* *The department approves of the work on the proposal by the applicant(s).*
* *The department acknowledges the sustainability of these affordable resources after the grant work is complete.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide a letter of support.*

*Please provide the name and title of the department chair (or other administrator) who provided you with the Letter of Support.*

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| *Dr. Nasser Momayezi, Dean* |

# Grants or Business Office Acknowledgment Form

*Institutional Grants/Business Offices will be responsible for fund disbursement, often in correspondence with the Department Chair, including expense and travel reimbursement. All applicants will need to provide a signed Acknowledgement Form, the template for which is linked on the RFP page, stating that the Grants/Business Office knows about the applicant’s intent to apply for an Affordable Materials Grant. Either the Department Chair or the Project Lead can work with the Grants/Business Office to get this signed form.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide this form.*

*Please provide the name and title of the grants or business office representative who provided you with the acknowledgement form.*

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| *Melody Carter* |