Application for UCSC DCG Funds
Submit to the Academic Senate Office, c/o Susanna Wrangell (swrangel@ucsc.edu) by December 19, 2014 or March 20, 2015.

Proposals must be approved by the department or program chair and Dean. They are due in the Academic Senate Office by December 19, 2014 or March 20, 2015 at 5 p.m. and may be submitted by email to swrangel@ucsc.edu.

1) Proposed title for Disciplinary Communication Grant (DCG)?

Development of Disciplinary Communication teaching resources for MCD Biology courses.

2) Department/Program:

MCD Biology department, covering DC courses required in the following majors:

MCD Biology, Neurobiology, Human Biology, Biochemistry and Molecular Biology.

3) Amount requested: $16,100

4) Number of students affected: >400 students/year

5) Overview of the program's DC requirement:

The MCD Biology department supports a large collection of majors including Biology BS (shared with EE Biology), Biochemistry and Molecular Biology (shared with Chemistry and Biochemistry), MCD Biology, Human Biology and Neurobiology.

Students in the Biology BS major satisfy their DC requirement with a combination of EE Biology courses, but these students also occasionally take MCD Biology sponsored lab courses that carry DC credit.

Students in the Human Biology major satisfy their DC requirement by taking Biol130/L (Human Physiology) and Biol189/W (Health Sciences Internship).

Students in the Biochemistry and Molecular Biology major (shared with Chemistry and Biochemistry) as well as those students in the MCD Biology and Neurobiology majors, satisfy their DC requirement by taking one of a collection of upper division lab courses, most of which are offered by MCD Biology.

As an alternative to the lab courses described above, students in the Biochemistry, MCD and Neurobiology majors can satisfy their upper division lab and DC requirements by

taking Biol186L. Biol186L is a blended lecture/independent study course where students receive credit for independent research performed under the guidance of a faculty mentor and for a weekly meeting with a faculty member and other Biol186L students where they discuss practice and disciplinary communication related issues and write a term paper related to their independent research.

The vast majority of students who satisfy their DC requirement in a MCD Biology sponsored major write one of three types of term papers:

- An extensive lab report in the form of a scientific journal article.
- A paper in the form of a research grant application.
- A paper in the form of a scholarly review.

6) What is proposed?

We are proposing to design a collection of teaching resources that will help DC faculty to (i) scaffold students' work during the quarter, thereby increasing students' success in preparing the major writing project associated with DC classes; (ii) articulate discipline specific writing practices in ways that are accessible to students; and (iii) provide a commensurate education across DC courses in MCD Bio.

The proposed teaching resources include:

1. Three ten-week curricula (one per type of term paper)
2. Online modules for use in each 10-week curriculum; these modules will address issues about writing that are germane to the biological sciences
3. Worksheets to accompany the online modules and support in-class activities featured in the 10-week curricula
4. Training materials that prepare DC instructors to provide targeted feedback to students using techniques that reduce the "commenting burden" and improve student response to feedback

Our ultimate goal is to create a structure that supports student learning, instructors' teaching, and program assessment with respect to the DC.

Ten-week model curricula:

We will develop an example ten-week curriculum for each of the three standard types term paper assignments described in section 5 of this proposal. These curricula will include suggestions for building a system of continual revision into writing assignments along with robust peer review. Peer review will be used to improve the quality of the work of the student receiving the review and also to provide the student reviewer an opportunity to critically reflect upon the elements of effective science writing. Additionally, while monitoring student peer reviews, the instructor can identify and highlight examples of effective review for the class. An explicit goal of incorporating

peer review (in addition to that of the instructor) into writing instruction is to enable more rounds of writing and revision than are possible if the instructor performs all paper critiques. Importantly, education research indicates that, properly guided, peer reviews can be as effective at improving student writing as an instructor's feedback. To promote student learning, the model curricula will also include materials for introducing students to techniques for effective peer review as well as how to respond to a reviewer's comments.

The curricular materials described above will be developed with an understanding that individual instructors will likely wish to adapt materials to the needs of their particular class. The peer review component of the curriculum will be designed to take advantage of web-based tools (*e.g*., elireview.com; peerceptiv.com) that facilitate exchange of student papers and comments, and instructor monitoring of student reviews. However, use of these tools will not be a necessary component of the model curricula. The type of peer review that we are proposing could be conducted in person or through something as simple as Google Docs.

Online modules and worksheets:

We will develop written and video resources for use in the curricula that that describe for students the central issues in disciplinary communication in the biological sciences.

Topics will include:

- Mechanisms of scientific communication (journal articles, seminars, posters)
- Types of journal articles (e.g., scientific reports, reviews)
- Library research techniques (literature searches)
- Techniques for judging the impact of a paper and standing of its authors
- The processes of scientific publication:
    - Submission
    - Peer review
    - Editorial decision making
    - Revision
    - Page charges and open access journals
    - Ethical considerations
- Grant writing formats and strategies
- Techniques for avoiding plagiarism

Some of these materials will be developed in-house; others will be curated from available online resources.

Teacher-training materials on providing feedback:

We will create training materials that provide instructors with suggestions for providing effective feedback to students (such as the use of video feedback and assessment

rubrics), as well as examples of efficient and effective feedback. Some of these materials, such as the assessment rubrics, could be designed to assist with program assessment of the DC courses.

Faculty roles in the project:

Dr. Shearer's role in the proposed work will be to help identify best practices in writing instruction and identify ways in which faculty can improve the efficiency and efficacy of their teaching efforts.

Dr. Hartzog will develop content-specific materials, identify likely course-specific constraints on writing instruction, develop the web site for delivery of the curricula and teaching materials developed in this project, perform student and faculty surveys and communicate the results of this project to MCD faculty.

7) What problem will this proposal solve?

A survey of both ladder rank faculty and lecturers in the department and discussions with members of the campus writing program revealed a number of areas of concern. First, not all instructors have a clear understanding of campus expectations for DC instruction. Second, DC instruction is viewed as an unfunded mandate that must be completed in addition to all the prior course content in the DC courses. Third, science faculty feel poorly prepared to teach writing, particularly since many students are viewed as lacking fundamental (in addition to discipline specific) writing skills. Fourth, having no prior training in writing instruction, departmental instructors are unaware of best practices in writing instruction and thus are frequently inefficient and ineffective when providing feedback on student writing.

The proposal described above aims to:

- Provide a mechanism for clearly communicating to faculty campus expectations and MCD Biology departmental commitments for DC instruction.
- Provide a centrally located and easily accessible set of tools and suggestions for DC instruction. These will include:
    - Sample lesson plans for the major types of papers assigned in DC courses
    - Resources for DC instruction, *e.g.,* material on strategies for literature searches, evaluation of an author's credentials and a paper's impact on the field, construction of a bibliography, plagiarism and expectations for allocating credit.
    - Suggestions for and reading on providing effective and efficient feedback on student writing assignments including incorporation peer review into writing instruction.

8) How does the DC fit within your program's learning outcome goals?

Each major sponsored by our department includes the goals that students be able to use effective oral and written language skills to communicate scientific data and ideas. This proposal aims to provide instructors with better tools for teaching the norms of writing in the biological sciences.

9) Detailed budget: (you may attach additional spreadsheet)

1 course relief for Heather Shearer, Head of Writing Program	$8050
1 course relief for Grant Hartzog Professor of MCD Biology	$8050
Total Budget:	$16,100

10) Assessment plan. How will the effectiveness of this change be measured?

We will survey both students and faculty instructors in the first year that the new DC materials are introduced, make adjustments as necessary and repeat the surveys the following years. We will collate and collect data from student assessment rubrics to provide a structured and consistent mechanism of monitoring student performance over time. These data are a potentially rich source of information that can be used to identify particular weakness (and strengths!) in our student population and courses, best practices and future targets for instructional improvement.

11) Sustainability. How will this innovation be continued without DCG funding?

We are not proposing new courses or instruction resources. If faculty choose to use the online resources of Eli Review or Peerceptive (to facilitate peer review and paper revisions as described above), students will pay a fee of $7 to $25. However, while potentially useful, these tools are not necessary for any of the improvements in DC instruction envisioned here. Other resources produced through the work described in this proposal will be delivered to instructors and students via the web and maintained on campus servers. Thus, there should be no new significant ongoing expense associated with maintaining or delivering these materials. It is likely that new resources will be added to this site over time, but the resource costs associated with maintaining the site will be negligible.

Recommended by (or attach dated email approval):

_____ _____ Dept. Chair or Program Director Date

_____ _____ Dean Date

Alan Zahler <zahler@ucsc.edu> March 18, 2015 3:23 PM
To: Grant hartzog <hartzog@ucsc.edu>
DCG proposal

Dear Grant

That is a really nice proposal that you prepared for use of the DCG funds to develop better ways for us to deliver and evaluate the DC writing component of our upper division curriculum. I think it will be incredibly valuable to our programs to develop the proposed resources. I approve of your proposal.

Is this email sufficient or would you like a letter outlining the benefits of the proposed work for our department? You do such a great job making the case in the proposal already, but I'm happy to write a separate formal letter of support.

Thanks for taking on this valuable work.

Al

Alan M. Zahler, Ph.D.
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dave <dave@dave.ucsc.edu> March 20, 2015 10:27 AM
To: Grant hartzog <hartzog@ucsc.edu>
Re: DC improvement grant

Dear Grant,
I have read this and approve it.
best,
Dave Belanger
Associate Dean
Physical and Biological Sciences

On Fri, 20 Mar 2015, Grant hartzog wrote:

> Hi Dave- As promised, here is the copy of the DC improvement grant. If you approve it, could you please reply to this email?
>
> Thanks!
>
> Grant Hartzog
> Professor
> MCD Biology
> 831-459-5826