Letters of Support

The following list indicates the authors of the letters of support that follow this page, their affiliation and the content of their letter.

- **Bethany Moore, PhD:** Interim Chair of Department of Microbiology & Immunology at the University of Michigan; Statement of University Support
- **Malinda Matney, PhD:** Instructional consultant within the Center for Research on Learning & Teaching at the University of Michigan; Support of educational assessment and instructional material development
- **Evan Snitkin, PhD:** Assistant Professor in the Department of Microbiology & Immunology; co-instructor with Schloss (PI) in MICRBIOL 612: Microbial Informatics and adopter of in person Code Club model with his research group
- **Adam Lauring, MD/PhD:** Associate Professor in the Department of Microbiology & Immunology and Internal Medicine; adopter of in person Code Club model with his research group
- **Marcy Balunas, PhD:** Associate Professor in the Department of Department of Pharmaceutical Sciences at the University of Connecticut; Schloss Lab Code Club participant during her sabbatical at the University of Michigan and adopter of in person Code Club model with her research group

University of Michigan
Medical School

Bethany Moore, Ph.D.
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June 4, 2020

Dear Pat,

I am writing in support of your proposal, “Code Clubs: Repeated practice opportunities to develop reproducible data analysis skills”, which you are submitting to the “Training Modules to Enhance the Rigor, Reproducibility and Responsible Conduct of Biomedical Data Science Research (R25)” program at NIGMS. ***You continue to have the full support of the Department of Microbiology & Immunology and the School of Medicine in this endeavor including assistance in the provision of adequate staff, facilities, and educational resources to contribute to your planned research education program***. Since you joined the department in 2009, you have successfully leveraged extramural support to continuously fund your research program, train exceptional graduate students and postdocs, and continue your excellent research career.

You have also made a significant impact on the teaching mission within the department by developing popular courses in *Symbiosis* and *Microbial Informatics*. I was excited to hear that you have been using *Microbial Informatics* as a seedbed to develop the ideas you are proposing in this proposal. The enrollment of your courses steadily grow and frequently attract the attention of senior graduate students and postdocs who take the class not because they need it for graduation, but because they need it for their research. This is a high compliment that busy researchers stop to take your class because they find it useful and well taught. In fact, one of my pulmonary clinical fellows took your course when he was just learning to analyze microbiome data and he is now a K99/R00 funded researcher on the tenure-track here at Michigan. Within these courses you do a great job of attracting a diverse array of students from various departments and strong representation of women. This was highlighted by you opening your recent offering of *Microbial Informatics* to bench scientists working from home because of the COVID-19 pandemic. I was impressed that you had more than 100 people participating across the 3 full day workshop. I am confident that you will continue to leverage these types of experiences as you prepare, evaluate, and disseminate the proposed materials to biomedical researchers at other institutions.

My research group is increasingly using high throughput tools to study the role of the immune system in lung fibrosis and stem cell transplant. The challenges you describe in your proposal of helping bench scientists to develop data analysis skills that are robust and reproducible is significant. As your project goes forward, we would be happy to share questions and example datasets with you that you could use to motivate your teaching modules. For instance, we have microbiome datasets from the lung and gut in two different disease models in human and mice, several RNAseq datasets and a large plasma proteomics dataset with longitudinal collections over 12 months. I would be pleased to help provide relevant research questions for the students to practice using these datasets.

I am excited about this proposal and wish you the best of success in this new project!

Sincerely,

Bethany Moore

Interim Chair, Department of Microbiology and Immunology
Galen B. Toews, MD Professor of Internal Medicine

CRLT CENTER FOR RESEARCH ON LEARNING & TEACHING
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11 June 2020

Dear Pat:

I was excited to hear about your R25 proposal, “Code Clubs: Repeated practice opportunities to develop reproducible data analysis skills” that you are submitting in response to the recently announced “Training Modules to Enhance the Rigor, Reproducibility and Responsible Conduct of Biomedical Data Science Research” RFA at NIGMS. It is clear that you are passionate about the proposed instructional materials and have innovative ideas for implementing the materials and assessing the modules themselves as well as the researchers that take the modules.

The mission of the Center for Research on Learning and Teaching (CRLT) at the University of Michigan is “dedicated to the support and advancement of evidence-based learning and teaching practices and the professional development of all members of the campus teaching community. CRLT partners with faculty, graduate students, postdocs, and administrators to develop and sustain a University culture that values and rewards teaching, respects and supports individual differences among learners, and creates learning environments in which diverse students and instructors can excel.” As you proceed with this project, other CRLT staff and myself would be happy to provide you with fee-based services such as performing focus groups and surveys to assess the materials you develop. We are also able to provide complimentary consultations for developing IRB protocols, should those be needed.

It is exciting to see your project taking shape and we are anxious to see how these modules develop. Please be in touch as you move forward.

Sincerely,

Malinda M. Matney, Ph.D.
Managing Director

University of Michigan
Medical School

Evan S. Snitkin, Ph.D.
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June 10th, 2020

Dear Pat,

I was excited to hear that you are submitting your proposal, “Code Clubs: Repeated practice opportunities to develop reproducible data analysis skills”, to further develop your concept of Code Clubs. As co-instructors of MICRBIOL 612: Microbial Informatics, we have often discussed the challenges of teaching data science concepts in a compressed workshop-style framework. I know that you have thinking deeply about how to help students to continue to develop their skills when our class is over.

I share your concerns and like you, I struggle to recruit and train scientists to engage in computational research. I first became aware of your lab’s Code Clubs when one of my students told me about her participation in yours. She thought they were worthwhile and has encouraged me to incorporate them into our group’s regular lab meetings. I am confident that continuing to develop materials for running Code Clubs will have a significant impact on the development of people’s data science skills.

As you know, my research group is interested in bacterial genomics and using genome sequences to track outbreaks of antibiotic resistant bacteria. I would be happy to share research questions and existing data that you could use to motivate topics for your Code Club sessions. In addition, I will provide iterative feedback as I employ these Code Clubs in my research group.

Sincerely,

Evan Snitkin, PhD
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June 8, 2020

RE: Code Club R25 application

Dear Pat,

I am happy to write in support of your R25 application to develop Code Clubs as a widely distributed teaching tool for scientists. Programming has become an essential skill for biomedical scientists, and "good coding practices" are fundamental to ensuring rigor and reproducibility in research.

During the time that we have both been at the University of Michigan, I have always enjoyed our discussions around implementing data science practices and developing approaches to help members of our labs to develop their skills. Your innovative teaching in microbial bioinformatics (e.g. your local Software Carpentry workshops and your online Riffomonas tutorials) has been a tremendous help to my trainees and provided them with the skills necessary to do their work.

I think the concept of a Code Club, which your group developed, is innovative and has proven itself an effective training tool. As you outline in your proposal, students often have difficulty retaining knowledge or maintaining their coding skills after completing a course or workshop. I have found this to be a frequent problem in my own work, and Code Club effectively addresses this issue. In fact, borrowing your idea of a Code Club, my group has used your original reproducible research modules to seed discussions and tutorials at our lab meetings. It is exciting that your proposal will develop materials to help individuals and labs to strengthen their data analysis skills through the Code Club format. These materials will have a significant impact on training the next generation of scientists.

As you know, my research group studies the biology, evolution, and epidemiology of influenza and polio. We would be thrilled to help you find interesting questions and datasets to as you develop the materials for your Code Club sessions. Good luck on your exciting proposal!

Sincerely,

Adam Lauring, M.D., Ph.D.
Associate Professor

UCONN
UNIVERSITY OF CONNECTICUT

School of Pharmacy
Department of Pharmaceutical Sciences
Marcy J. Balunas, Ph.D.
Associate Professor of Medicinal Chemistry

June 6, 2020

Patrick Schloss, Ph.D.
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Dear Pat,

I am writing in enthusiastic support for your National Institutes of Health R25 proposal, entitled "Code Clubs: Repeated practice opportunities to develop reproducible data analysis skills". In 2018, I had the opportunity to spend my sabbatical working in your research group. As a natural products chemist, it was eye opening to see how you interacted with your group and helped them develop the tools they needed to analyze large microbiome datasets. I face a similar struggle with training students to analyze large metabolomics datasets. While at the University of Michigan, I took your data analysis with R class and participated in your group's Code Club sessions. I was impressed that trainees with very different interests and level of comfort with R could improve their skills in such a safe, friendly, and nurturing environment. When I returned to the University of Connecticut, I started doing similar Code Club activities with my research group motivated by questions related to what we are trying to do with mass spectrometry data. Although I still do not feel proficient in my programming skills, the format works because complimentary skills from members of my lab allow us to continually teach each other. I have enjoyed seeing your initial attempts at virtual Code Clubs as YouTube videos and know that those you make for the proposed project will give my group more material to strengthen our skills with reproducible research practices.

As we have discussed, my research group generates mass spectrometry data from a variety of symbiotic populations. These are large, messy datasets that require us to move data between different proprietary software packages. I would love to be able to help you find interesting questions and datasets that you could use to develop Code Club sessions that incorporate metabolomics data. I look forward to working with you and supporting the proposed project.

Sincerely,

Marcy J. Balunas, Ph.D.
Associate Professor of Medicinal Chemistry

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