

MICR5029 – Fall, 2021

Building Scientific Thinking Skills

Co-directed by Drs. Zhong and Griffith

Location: Library 2.011

Time: Wednesday and Friday from 2:00pm – 4:00pm

Goals: 1. Learning how to summarize research progresses, critically analyze research results and identify potential problems.

2. Learning how to raise a scientific question, develop working models and experimental approaches for testing your models (by writing F31-style grant proposals)

3. Learning how to defend your proposals

Grade: 50% from presentation/discussion and 50% from F31-style grant writing (only focusing on the one page specific aim and 6 pages of research strategy sections) and orally defending respectively. Full attendance is mandatory. Please note that letter grades (A, B, C or F) will be provided for this class.

The following is a tentative schedule:

September 8: class orientation, paper assignment and Q & A session.

September 15--- Student 1

September 17--- Student 2

September 22--- Student 3

September 24--- Student 4

September 29--- Student 5

October 1---Discussion about grant writing:

- a. MI track Qualifying exam requirements
- b. NIH F31 application requirements and critique criteria
- c. Steps required for developing an idea into a defensible proposal
- d. Review an example QE grant from a previous student
- e. Review an example NIH grant with specific aim page and 6 page research strategy

October 1 to November 10: Proposal writing, critique by students, faculty, and mentors, submission of the final proposals and related documents

Suggested writing schedule:

Week 1: Hypothesis/Specific Aims

Week 2: Full Specific Aims Page, Significance and Innovation

Week 3: Research Plan

Week 4: Research Plan/Revisions

October 29---- F31-style grant due. Give the grant to your colleagues (3 students/grant) and your mentor. Please also email a copy to Drs. Zhong & Griffith.

November 3--- student critique due. Please give your critiques back to the author students. After getting the critiques, please respond to the critiques by modifying your F31-style grant accordingly. Even if you don't agree with some of the suggestions, you need to respond to all suggestions/comments/concerns by providing an item-by item response letter justifying your responses.

November 10--- final F31-style grant due. The final grant will be forwarded to the faculty for review. Submit final version. Please e-mail Drs. Zhong & Griffith the following documents:

- a) The final version of your F31-style grant (we only need your revised version)
- b) Critiques you have received from all student reviewers
- c) Your item-by-item response/statement on how you have responded to the critiques and addressed the concerns in the revised F31-style grant.

MICR5029 oral defense schedule.

November 12:

2pm: Student 1

3pm: Student 2

November 17:

2pm: Student 3

3pm: Student 4

November 19:

2pm: Student 5

Class requirements:

1. Paper presentation and discussion - Prepare a 45 min power-point presentation on the paper assigned to you. The papers will be assigned on the first day of the introduction session. Your presentation should include all relevant background information, introduction on the related subjects (rationale for the hypothesis tested in the paper), a clear description of the hypotheses tested and experimental approaches used for testing the hypotheses. Please note that each student is expected to read all the papers and prepare for an in-depth discussion of each paper. Following the 45 min presentation, students will be randomly asked to explain

each figure/result in details, critically analyze the results, identify potential problems and propose alternative experiments (if the original experiments fail to adequately support the authors' conclusions). These activities will help the students to develop the skills for logically presenting scientific findings, critically analyzing research results, identifying potential problems/pitfalls and proposing alternative strategies to address the pitfalls.

2. F31-style grant - Prepare a F31-style grant based on your dissertation project topics. You are advised to consult with Drs. Zhong/Griffith, your mentor, or any other faculty members about your grant topics before you start to write your full proposals. Your proposal writing should include the following:

- a. The F31-style grant full proposal should consist of specific aims (up to 1 page) and research strategy (significance and innovation, 1-2 pages and approach, 4-5 pages) sections (6 pages total for research strategy). Ask your colleagues to review your proposal.
- b. Review the proposals of three other members of the class. Please provide a ½ - 1 page written critique for each proposal.
- c. Revise your proposal based on the written critiques from your classmates. You need to summarize your responses to the critiques on a cover page. If you choose not to take your classmates' advice, please provide justification.
- d. The final submission should include a final revised version of your proposal, reviewers' comments and your responses to reviewers' comments.

3. Orally defend your grant proposal

- a. Prepare a 15min presentation to summarize your proposal. The proposal should include the suggestions provided in the critiques.
- b. We will go around the table for each student to ask the speaker questions related to the proposals.
- c. Faculty will periodically comment on both the questions and answers and examines the presenter and the class on related issues (this practice may help you to prepare for the Ph.D. candidacy exam).

List of students registered for 2021 class:

Garza,Rolando garzar18@livemail.uthscsa.edu
Morales,Marisol moralesm20@livemail.uthscsa.edu
Simper,Jan simperj@livemail.uthscsa.edu
Wedemeyer,Sarah Ann wedemeyers@livemail.uthscsa.edu
Yusoof,Kizil Ather yusoof@livemail.uthscsa.edu

List of articles for 2021 class:

1. Apollo Stacy¹, Vinicius Andrade-Oliveira², John A McCulloch³, Benedikt Hild⁴, Ji Hoon Oh⁴, P Juliana Perez-Chaparro⁵, Choon K Sim⁶, Ai Ing Lim², Verena M Link², Michel Enamorado², Giorgio Trinchieri³, Julia A Segre⁶, Barbara Rehermann⁴, Yasmine Belkaid⁷. **Infection trains the host for microbiota-enhanced resistance to pathogens.** *Cell*. 2021 Feb 4;184(3):615-627.e17. doi: 10.1016/j.cell.2020.12.011. Epub 2021 Jan 15.
2. **Kylie R James**¹, Tomas Gomes², Rasa Elmentaite², Nitin Kumar², Emily L Gulliver³, Hamish W King⁴, Mark D Stares², Bethany R Bareham⁵, John R Ferdinand⁶, Velislava N Petrova², Krzysztof Polański², Samuel C Forster^{2,3,7}, Lorna B Jarvis⁸, Ondrej Suchanek⁶, Sarah Howlett⁸, Louisa K James⁴, Joanne L Jones^{8,9}, Kerstin B Meyer², Menna R Clatworthy^{2,6}, Kourosh Saeb-Parsy⁵, Trevor D Lawley², Sarah A Teichmann^{10,11,12}. **Distinct microbial and immune niches of the human colon.** *Nat Immunol*. 2020 Mar;21(3):343-353. doi: 10.1038/s41590-020-0602-z. Epub 2020 Feb 17.
3. Daniel F Zegarrra-Ruiz¹, Dasom V Kim^{1,2}, Kendra Norwood³, Myunghoo Kim^{3,4}, Wan-Jung H Wu^{1,5}, Fatima B Saldana-Morales^{1,6}, Andrea A Hill⁷, Shubhabrata Majumdar^{5,8}, Stephanie Orozco⁸, Rickesha Bell⁸, June L Round⁸, Randy S Longman^{9,10,11}, Takeshi Egawa¹², Matthew L Bettini¹³, Gretchen E Diehl^{14,15,16}. **Thymic development of gut-microbiota-specific T cells.** *Nature*. 2021 Jun;594(7863):413-417. doi: 10.1038/s41586-021-03531-1. Epub 2021 May 12.
4. **Roland Ruscher**¹, S Thera Lee¹, Oscar C Salgado¹, Elise R Breed¹, Sara H Osum¹, Kristin A Hogquist¹. **Intestinal CD8 α IELs derived from two distinct thymic precursors have staggered ontogeny.** *J Exp Med*. 2020 Aug 3;217(8):e20192336. doi: 10.1084/jem.20192336.
5. **Christine H Miller**¹, David E J Klawon¹, Sharon Zeng¹, Victoria Lee¹, Nicholas D Socci², Peter A Savage³. **Eomes identifies thymic precursors of self-specific memory-phenotype CD8⁺ T cells.** *Nat Immunol*. 2020 May;21(5):567-577. doi: 10.1038/s41590-020-0653-1. Epub 2020 Apr 13.