I am fluent in the language of category theory. I learned categorical methods through self-study as an undergraduate and by taking part in the second Kan Extension Seminar. During my undergraduate thesis project, I put forward a graphical calculus for double categories and proarrow equipments and a proof of its correctness. However, this proved too much for the page limit, so my actual thesis consisted of a brisk tour through enriched category theory.

Now, I am a student of Emily Riehl's and take part in the Category Theory seminar at Johns Hopkins. I have not decided on a thesis topic yet, but I expect it to be in the field of category theory or adjacent work in homotopy type theory.

As described below, I have research experience in David Spivak's project area.

I expect to complete my P.h.D in Spring of 2023, but I am not sure of my thesis topic yet.

I can commit to coming to Oxford this summer.

Order of interest:

1. David Spivak

I am interested in David's autopoeisis topic because I am deeply invested in understanding what it means to be *a thing*. The things we notice are the things that stick around long enough to be noticed, and these things engage in autopoesis to maintain themselves – whether via a rigidity in their structure or a continual remaking. Last summer, David, Brendan Fong, and I discussed what it means to be a thing and developed a framework, behavioral mereology, in which we can begin to articulate and answer this question and others related to it. The behavioral mereology approach to things begins with a motto of mine: "If you pull on part of a thing, the rest comes with." This motto is only the start; it may give us a sense of which parts of a system are *things*, but not as much on how those things maintain. This is why I am interested in the topic of autopoesis as David presents it: to understand how things (from individual grains of rice in a bowl, to species, social groups, memes, and climate events) maintain themselves.

The ACT School would contribute to my research goals by giving me a setting to learn from and collaborate with researchers coming from a variety of backgrounds. This is a necessity when setting out to study something as ubiquitous as autopoesis; each researcher draws from their knowledge base and intuitions, and together we can come up with an abstract and general theory that applies in all sorts of situations. I am particularly excited at the opportunity to learn more about the techniques of graphical logic; if our theory of things is expressable in such a logic, then that opens up the possibility for future graphical tools that can be used to help people, say, make their product the next big *thing*, or maintain workgroup cohesion in the face of organizational changes, etc.

David Jaz Myers

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Applying for the Applied Category Theory School 2019

Education

Johns Hopkins University *Expected 2023*

P.h.D in Mathematics
Advisor: Emily Riehl

Oberlin College *May 2017*

B.A. with High Honors in Mathematics
Thesis: *A Brisk Tour of Enriched Category Theory*
Advisor: Jack Calcut

Awards and Scholarships

Sigma Xi Member Spring 2016

Christopher Dahl Philosophy Essay Prize 2015
- Awarded for the essay *How do mathematical objects become formal?*

John F. Oberlin Scholarship 2012-2017

Papers and Preprints

- D. Spivak, D. Jaz Myers, B. Fong, *Behavioral Mereology*, arXiv:1811.00420, 2018
- D. Jaz Myers , *String Diagrams for Double Categories and Proarrow Equipments*, arXiv:1612.02762, 2016
- P. Thibodeau, D. Jaz Myers , S. Flusberg, *Similarity-Based Reasoning is Shaped by Recent Learning Experience*, in Proceedings of the 38th Annual Conference of the Cognitive Science Society. Austin, TX: Cognitive Science Society. 2016

Talks and Presentations

- Carnegie Mellon Homotopy Type Theory Seminar, "Towards an A1 Homotopy Type Theory", November 2018
- Johns Hopkins Category Theory Seminar, "The Logic is Coming from *Inside the Category*", October 2018
- MIT Categories Seminar, "What is a Thing", October 2018
- Johns Hopkins Category Theory Seminar, "Yoga of Four Operations", October 2017
- Category Theory Octoberfest, Carnegie Mellon University, "String Diagrams for (Virtual) Proarrow Equipments", October 2017
- Category Theory 2017 Conference, "String Diagrams for (Virtual) Proarrow Equipments", July 2017
- Category Theory 2017 Conference, with the Kan Extension Seminar, "Weighted (Co)Limits", July 2017
- Oberlin Mathematics Department Honors Lecture, "String Diagrams, Categories, and Enrichment", May 2017
- Oberlin Philosophy Department Special Lecture, "Thinking Recursively, Rethinking Corecursively", November 2016
- Joint Mathematics Meeting 2016, Poster Presentation, "Finding Dolev-Yao Intruder Knowledge with Cap-Matching", January 2016

Teaching

Teaching Assistant

Honors Linear Algebra *Fall 2018*

Linear Algebra *Fall 2018*

Calculus II *Spring 2018*

Calculus I for Biology *Fall 2017*

Service

Seminar Organizer *Fall 2017 - Spring 2018*
Johns Hopkins Graduate Student Seminar

Massachusetts Institute of Technology
Department of Mathematics

January 8th, 2019

To Whom It May Concern:

I give my strongest recommendation for David Myers to be admitted to the ACT School 2019.

I first met David in January 2017, when he participated in the second Kan Extension Seminar. David was an undergraduate student at the time. He has since gone on to become a graduate student of Emily Riehl's at Johns Hopkins University, and we have met repeatedly at conferences over the past two years. He has also visited MIT, and with David Spivak the three of us have coauthored a short paper, entitled 'Behavioral Mereology', which is on the reading list for ACT School 2019.

Throughout the time that I have known him, David has a stood out as an exceptionally promising category theorist. His *undergraduate* thesis developed a novel graphical framework for double categories and equipments, and has been submitted for publication. This has already appeared as a blog post on the *n*-category café; during the Kan extension seminar, he contributed two excellent further blog posts, on weighted limits and a famously difficult paper of Kelly on essentially algebraic theories in an enriched context. He was also active on the seminar forum, and both I and the other participants greatly benefited from his clear, insightful writing. We have had many lengthly conversations and email exchanges since.

David wishes to join David Spivak's group, which I will be TAing. David Myers has a strong interest in this topic; indeed, he conceptualised and with David Spivak and I *coauthored* one of the papers on the reading list. It is one of the questions that he posed to us, “what is a thing?”, that helped motivate our choice of topic. Both David Spivak and I would be very excited to have him join us.

In short, I iterate that I give my strongest recommendation that he be included in the ACT School 2019, both because I have no doubt he will be an outstanding teacher to others and contributor during the research week, as well as because I think it is essential that we bring in talented young students as him into our community.

If you require any further information please do not hesitate to contact me.

Sincerely,

Brendan Fong

Postdoctoral Associate
Department of Mathematics
Massachusetts Institute of Technology
email: bfo@mit.edu