

# Graduate student perspectives on the importance and difficulty of finding a research group

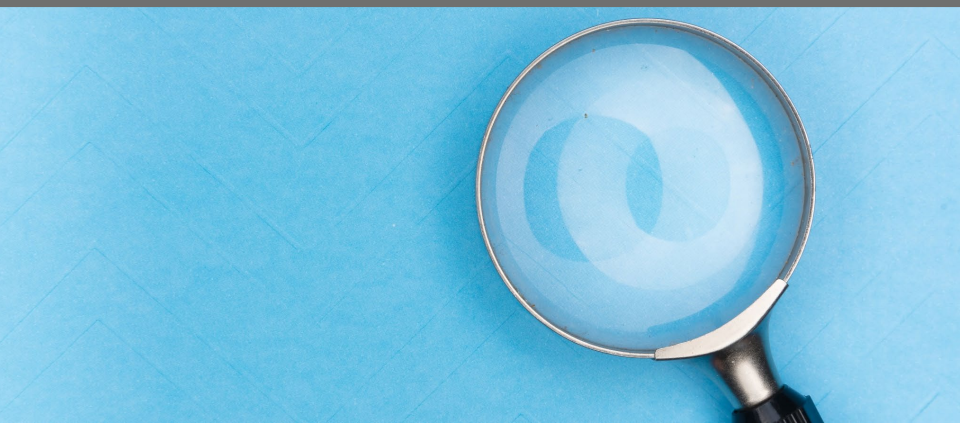
Mike Verostek,  
Casey Miller, and Ben Zwickl

3/7/2025

**RIT** | Rochester Institute of Technology



**IGEN**



## An ongoing problem in STEM PhD programs

- Attrition rates across STEM doctoral programs estimated to be approximately 40%<sup>1</sup>
  - "Mathematics and Physical Sciences" around 45%
- Disproportionately affects traditionally underrepresented students<sup>2</sup>
  - 10 year completion for URM students < 50%
- Most often in first two years



<sup>1</sup>Council of Graduate Schools (2008), <sup>2</sup>Council of Graduate Schools (2015)

## Advisors play a critical role

- Quality of advising relationship is known to motivate students to stay or leave<sup>3,4</sup>
- Advisors can “make or break a Ph.D. student”<sup>5</sup>



<sup>3</sup>Devos et al. (2017) <sup>4</sup>Lovitts (2002) <sup>5</sup>Lee (2008)

## Why study students seeking research groups?

- Existing research focuses on productive mentorship in preexisting advising relationships<sup>6-8</sup>
- Little is known about how advisor/advisee partnerships form



# Common advisor selection process in physics



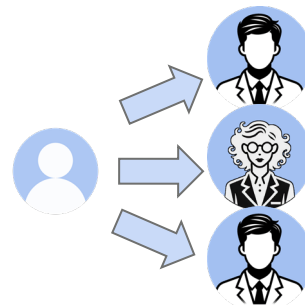
Prospective  
physics graduate  
students



Application/  
Admission



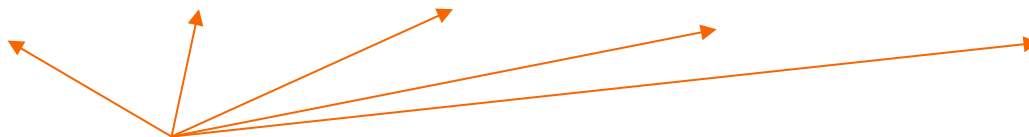
Arrival in program:  
Begin thinking  
about advisors



First year: Talk to prospective  
advisors and graduate students,  
attend research seminars



Join a group  
end of first year

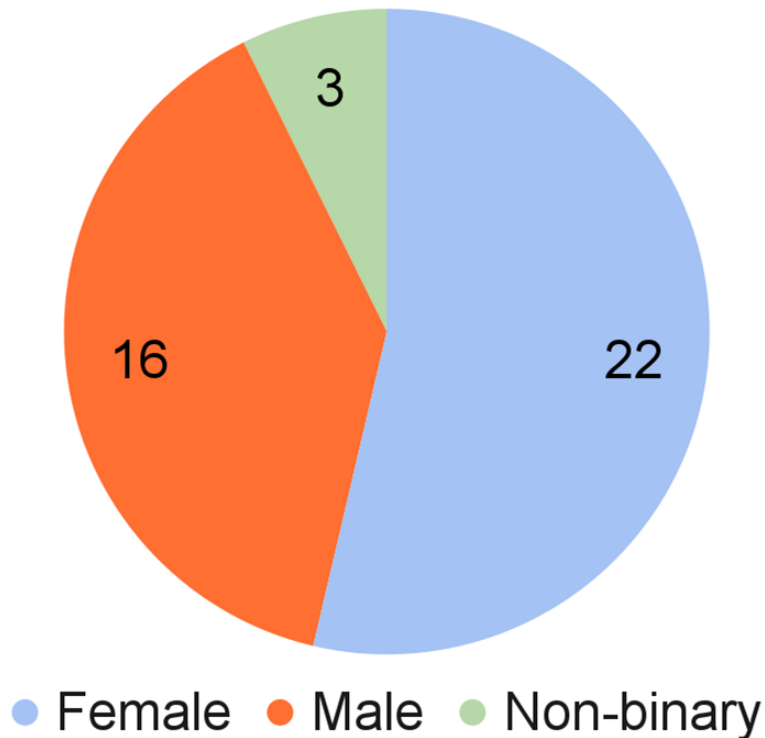


- **Student's responsibility** to seek out an advisor
- Lack of structure opens the door for systemic inequities

# Methods

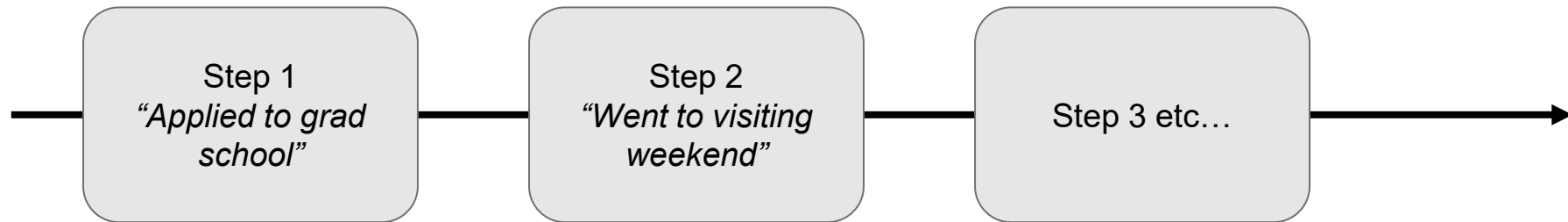
## Who we interviewed

- 40 physics PhD students
- 13 US institutions represented
- 21 in first year of grad school
- 19 in second year
- 45% identified as white, 55% as nonwhite



## What did we ask?

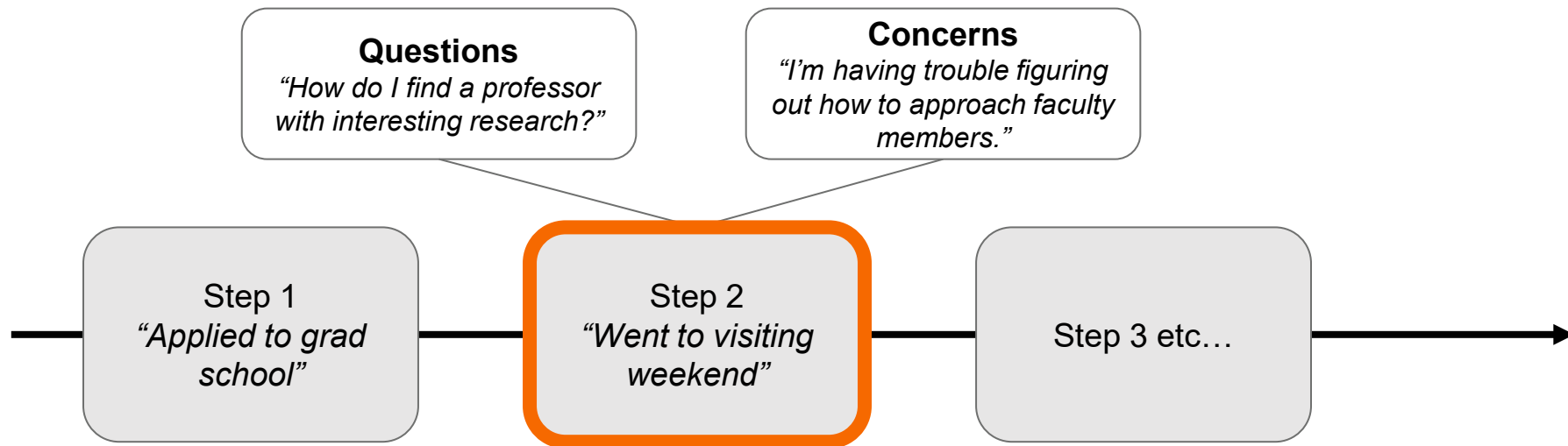
First, gather a **timeline** of steps...





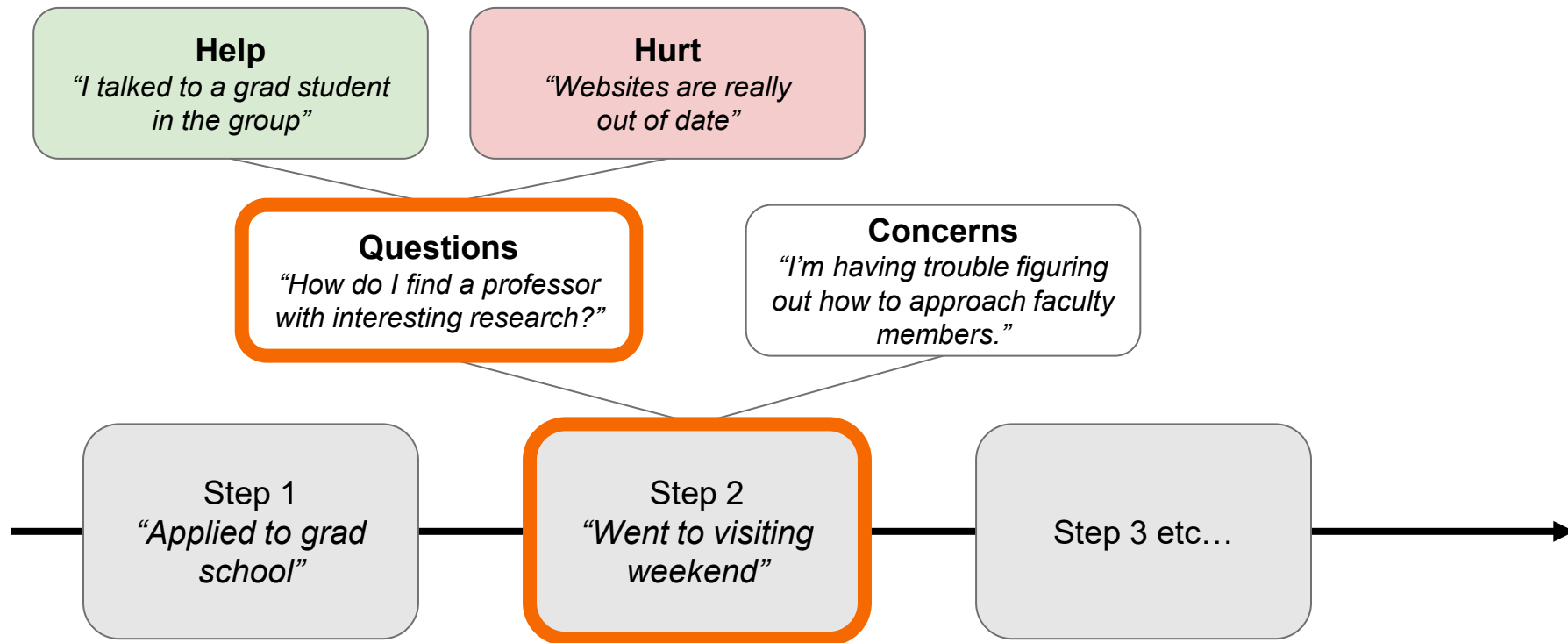
## What did we ask?

At each step, what were major **questions** or **concerns**?



## What did we ask?

For each question, what **helped**? What got in your way (**hurt**)?



# Results

## Two broad themes highlighted today

1. Importance of the process
2. Difficulties finding a group



## Theme 1: Importance of the process

students perceived this as a...

### Significant decision

because of...

*Knowing advisor relationship  
is important*

*Long-term commitment*

*Impact on future careers*

*Impact on staying in the  
program*

which have...

### Differential importance for women and nonbinary students

because...

*Finding inclusive group is  
particularly high priority*

can lead to

*Fewer research  
advisor options*



Gabriela

*“Even before I started applying for graduate programs, all I heard was, **‘Your relationship with your PI can make or break your career.’**”*



Chloe

*“I got weird feelings realizing that they were going to be like, **in charge of my life for the next five years.**”*

## Theme 1: Importance of the process

students perceived this as a...

**Significant decision**

because of...

*Knowing advisor relationship  
is important*

*Long-term commitment*

*Impact on future careers*

*Impact on staying in the  
program*

which have...

**Differential importance for women and nonbinary students**

because...

*Finding inclusive group is  
particularly high priority*

can lead to

*Restricted research  
opportunities*

impacts on...

**Sense of belonging**

due to...

*Being in group adds  
sense of belonging*

*Difficulty navigating  
group search  
contributes to isolation*

**Highlight these  
results here**

## Struggling to find group can drive feelings of isolation

- Students often compare their progress finding a group with others in their cohort



Dev

*"It is a bit stressful though in the sense that, **for some of the people, before even coming here they had fixed on an advisor.** Everything was fixed... they'll go and do the PhD. So talking to [those students] was not really helpful because **they are not going through any of this.**"*

## Struggling to find group can drive feelings of isolation

- Students often compare their progress finding a group with others in their cohort
- Made some students feel like they were failing



Brianna

*“When I saw that **everybody else had advisors, I was kind of freaking out**, because I'm like, how? They just got here, how do they already have advisors?”*

*“Just the fact, knowing that the people who came here with advisors already... Just knowing that fact was like, oh, okay, so **I'm not behind, like, I didn't just fail at everything.**”*



## Struggling to find group can drive feelings of isolation

- Students often compare their progress finding a group with others in their cohort
- Made some students feel like they were failing



Brianna


*“Personally, **I thought I was cursed**. Like I slighted the department in some way, thinking that I had offended someone and I was being blacklisted from the research advisors... It was like, **I guess I’m not supposed to be here**. Because everything is making it seem like it’s not working out.”*

## But joining a group boosts sense of belonging

Nathan



- Joined a group early first year
- Wasn't doing well in coursework and felt isolated

A green circular icon with a white silhouette of a person's head and shoulders, representing a user profile.

*"I expressed to [my advisor] that I might not stay for the whole program, **I might leave after a master's**. And we talked about that for a while."*

## But joining a group boosts sense of belonging

Nathan



- Joined a group early first year
- Wasn't doing well in coursework and felt isolated
- **His research group kept him in grad school**



*"[Doing research] **felt really good and independent**... I am still interested in physics, and there's still lots to do. That whole portion I still get very excited about... [my advisor] also **wants me to stay in the group** and keep doing the work, which is nice to hear."*

## Other benefits of getting into research early

- Provide community, boost sense of belonging

## Other benefits of getting into research early

- Provide community, boost sense of belonging
- **Less anxiety over search**



Luis

*"I felt **so relieved** that whole first year, that I didn't have to go out and look for a group as actively as everyone else did"*

## Other benefits of getting into research early

- Provide community, boost sense of belonging
- Less anxiety over search
- **Time to completion**

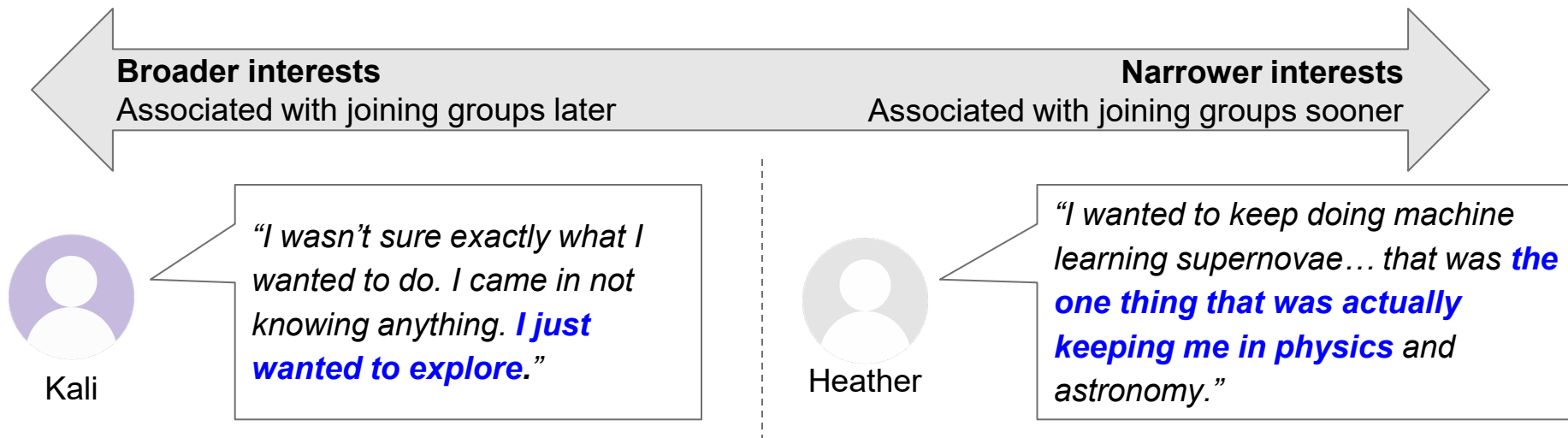


Heather

*"If I hadn't been in [my advisor's] group as a first year and kind of set on that path, **I don't think I would have had the resources or knowledge** to be ready to take my qualifying exam that early"*

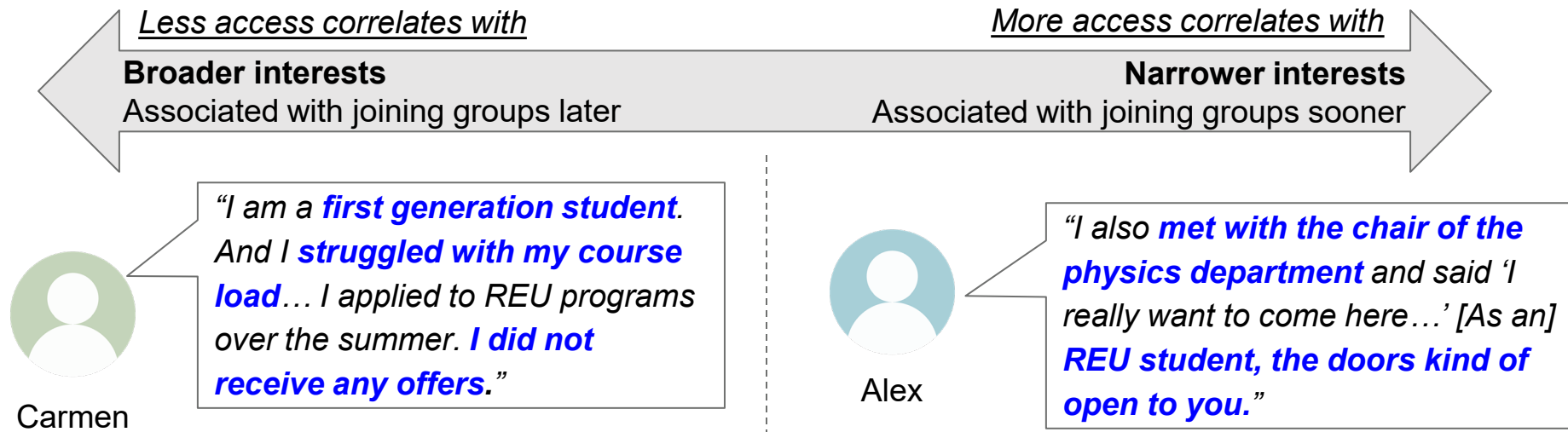
# Factors influencing when students join groups

- Certainty of research **interests**



## Factors influencing when students join groups

- Certainty of research **interests**
- Interests strongly influenced by **access** to resources like undergraduate research opportunities

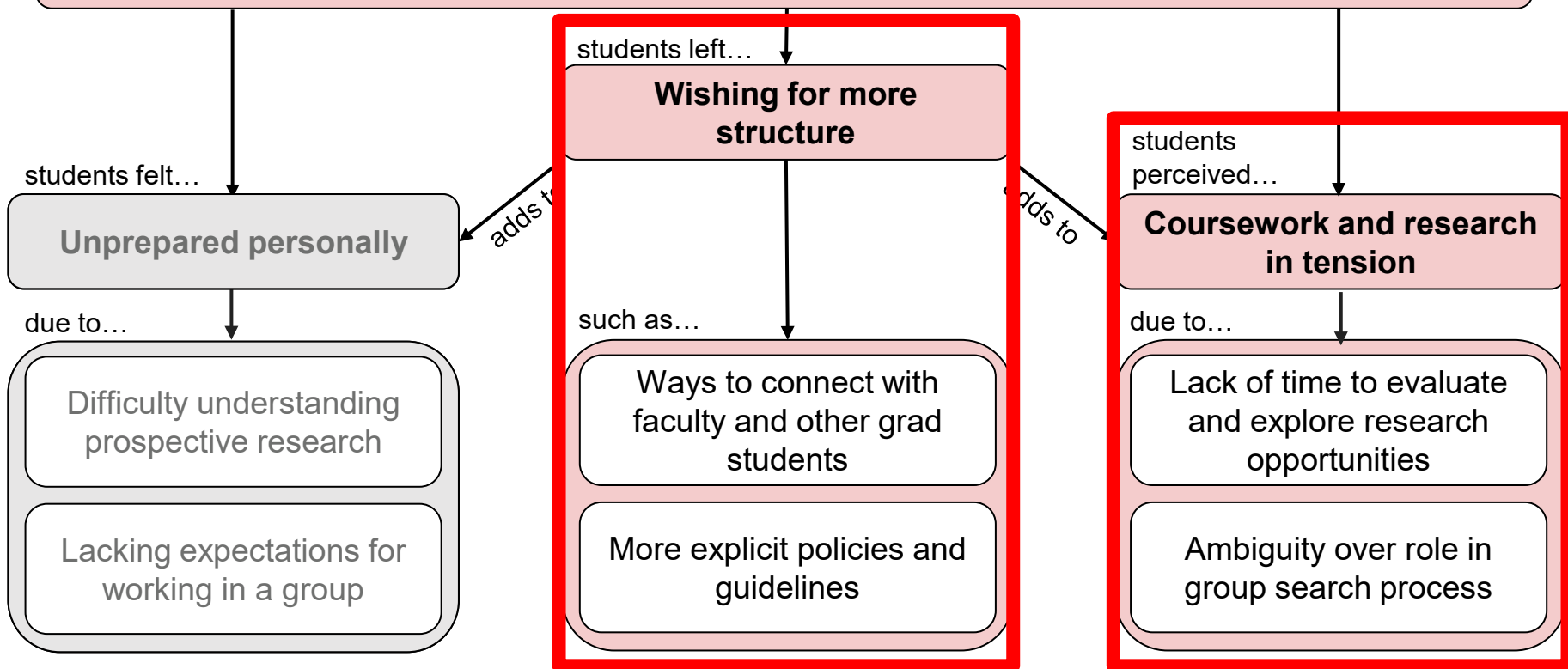




## Importance: Key Takeaways

- Finding a group can increase sense of belonging and support retention
- Access to opportunities like undergraduate research and advising help students find an advisor
- But such opportunities are not equally distributed across students
- **Critical to provide all students with structure and support**

## Theme 2: Difficulties finding a group



Highlight these results here

## Students wanted more structure

- Lack of guidelines and expectations lead to difficulties in the group search process



Luis

*"There's **no guidelines.**"*



Matias

*"The **department still hasn't done a really good job at facilitating** ways to learn more about groups here."*



Jack

*"Once you get here, you kind of have to **fend for yourself.**"*



Blake

*"[I was] a little confused about **what my role was supposed to be** in looking to join the groups."*

## Students wanted more structure

- **Example: what do graduate handbooks say about joining groups?**
  - One gave formal requirement
  - Six gave “typical” timelines
    - Spring semester? Third year?
  - Five don’t mention it
  - But coursework was prominent

### PhD Program Requirements

#### Overview

Our physics and astronomy PhD program typically takes five to seven years to complete and includes:

- **Coursework**
- Preliminary Assessment and Qualifying Examinations
- Teaching
- Research
- Dissertation

## Coursework and research in tension

- Classes didn't support belonging
- More often cited as hindrance to finding a group and starting research



Brianna

*"I think it was just like whether or not I had to find [a group] right away, as opposed to waiting out and **focusing on trying to pass the courses first**... I feel like doing all of that was a little bit stressful. I was also under the impression that I'd get a little bit more like advising help, like how to navigate through grad school and like I said, **I really just had to figure it out on my own.**"*

## Coursework and research in tension

- Classes didn't support belonging
- More often cited as hindrance to finding a group and starting research



Isaac

*"[Friends] would ask me sometimes, **have you found a research group?** And I'd be like no, I haven't even thought about it. **I'm trying to figure out the electric field of a charged hemisphere.**"*

## Difficulties: Key Takeaways

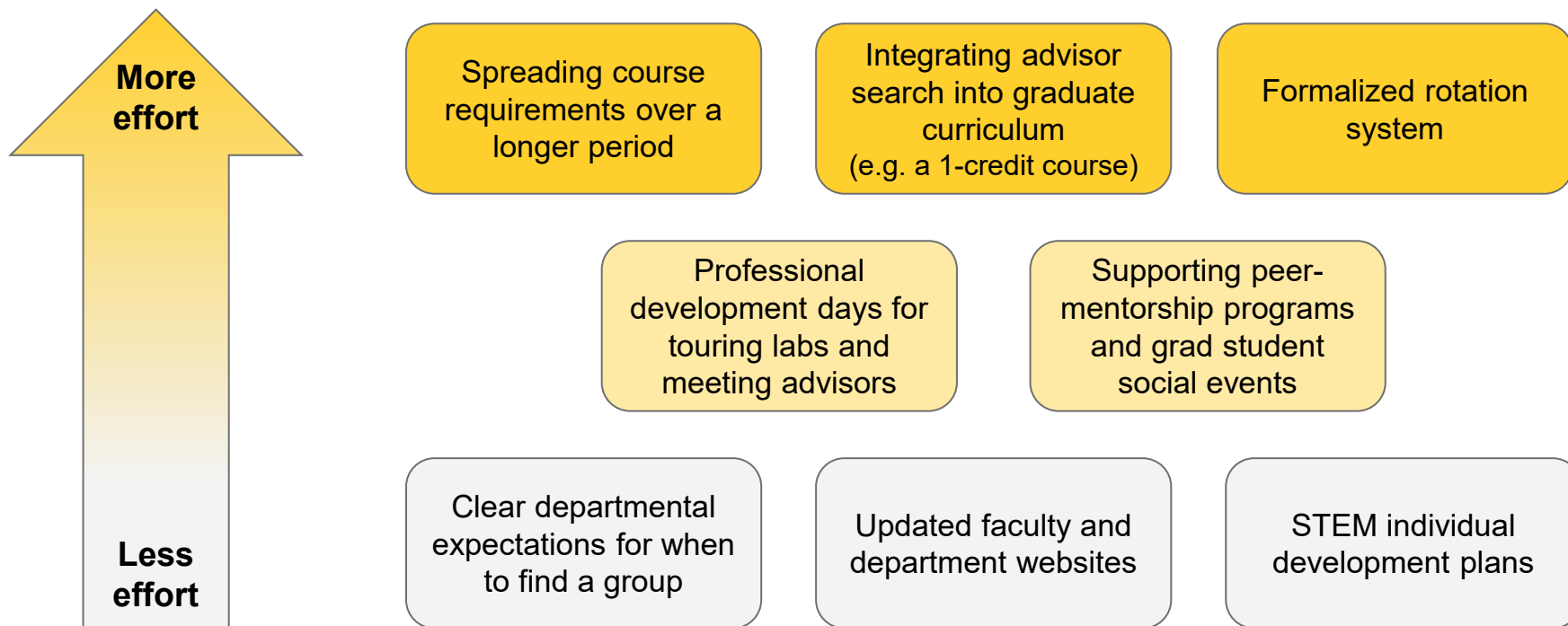
- Lack of structure & focus on coursework...
  - Made some feel like they were “falling behind” or “failing”
  - Contributed to 9 students thinking about leaving their programs
- Searching for an advisor **during** graduate school is harder
- Current structures disadvantage students who
  - Lack an initial connection or strong interest in a group
  - Don't have inside knowledge on how to “play the game”



# Directions for change



# Structures to promote retention and satisfaction





Contact me if you want to talk more!

E-mail: [mike.verostek@mail.rit.edu](mailto:mike.verostek@mail.rit.edu)

*Physics Ph.D. student perspectives  
on the importance and difficulty of  
finding a research group  
(May 2024 PRPER)*



*Modeling when and how physics Ph.D.  
students search for a research group: the role  
of interests and prior research experience in  
timely group integration (Sept 2024 PRPER)*

