

Playbook for

Exploratory Reading Groups

Fostering Creative, Relational, and Student-Driven Exploration, and
Establishing Pipelines into Undergraduate Research Experiences

Playbook for Exploratory Reading Groups

**Fostering Creative, Relational, and Student-Driven Exploration, and
Establishing Pipelines into Undergraduate Research Experiences**

Last updated: January 27, 2023

David T. Lee

Dustin Palea

Atira Nair

The origin and journey

We first began experimenting with Exploratory Reading Groups (ERGs) in the Summer of 2017. David had just finished his first year as a faculty at UC Santa Cruz and had begun exploring ways to provide richer learning experiences to undergraduates. Dustin, as a first-generation Pacific Islander passionate about educational technologies, had just finished his sophomore year, and had first-hand understanding of the challenges facing diverse populations. Since none of his friends or family had any experience with research, he had no idea what research entailed or how it might relate to his passion to innovate in education.

The reading groups were started on a whim: “Who knows, maybe undergraduate students will enjoy reading research papers...”. Surprisingly, many actually were! The discussions were not as in-depth as graduate student journal clubs, but they covered a broad range of topics and helped build peer connections, leading us to wonder: **What would it look like to design exploratory reading groups for fostering creativity, motivation, and supportive peer relationships, and to help broaden participation in STEM?** Over the next few years, with the support of NSF funding through the IUSE program and Program Director Stephanie August, the reading groups grew to serve 100+ students each year reading and discussing papers in small groups on topics such as Technology and Democracy, Socially Expressive Robots, Fairness in AI, Future of Work, and Safety of Autonomous Vehicles, each proposed by faculty working in the research area and framed to be socially relevant and motivating to students.

We, of course, ran into many challenges along the way. Having the faculty lead the groups was not sustainable, we began to plateau in the number of participants reached, and we encountered problems with stability of the groups (e.g. if one or two members left due to midterms, their groups would completely fall apart!). But, we were eventually able to expand to many faculty and students and shift toward groups that were stable and mostly student-run.

As we ran the groups, we began to notice that our reading groups were also providing **an additional unexpected benefit: their lightweight, scalable, and relational design made them an effective ad-hoc pipeline into undergraduate research experiences.** Since then, we’ve been able to institutionalize the reading groups and are now working closely with divisional leadership to grow the reading groups across engineering. Imagine a webpage where students could browse reading groups from every faculty on campus to explore cutting-edge ideas and research opportunities!

Our goal in creating this playbook is to share tips and resources along the entire journey of establishing ERGs across three stages: startup, growth, and institutionalization. **Exploratory Reading Groups are designed to be low time-commitment for both faculty and students, so they’re easy to run and scale!** We hope to see exploratory reading groups at campuses across the globe helping students stretch their creativity, develop passion and purpose for learning, foster supportive peer relationships, and connect with faculty research.

How to use this playbook

The playbook is designed to support different paths. You can follow it from beginning to end starting with background information on the why, how, and what of our reading groups (**Section 1**) followed by tips and resources for each of the three stages: startup (**Section 2.1**), growth (**Section 2.2**), and institutionalization (**Section 2.3**). At the end, we’ve listed resources that you can use when running reading groups at your institution (**Section 3**), which you can access by submitting a simple form at tech4good.soe.ucsc.edu/#/collectively.

For those who prefer to get their hands dirty, it should also be possible to skip or skim **Section 1** and jump directly to the tips and resources of **Section 2**. However, each stage within **Section 2** assumes you are already familiar with the tips and resources of the previous stages (to avoid repetition).

Table of Contents

1. The Why, What, and How of Exploratory Reading Groups	4
WHY should I run exploratory reading groups?	5
WHAT are exploratory reading groups?	7
HOW do exploratory reading groups work?	8
PRELIMINARY IMPACT	10
2. How to set up Exploratory Reading Groups	13
Startup Phase	14
Define reading group themes	15
Advertise to students	16
Running the Launch Session	17
Weekly Meetings	19
End-of-Quarter Debrief	20
Growth Phase	21
Recruiting more faculty	22
Setting up new faculty themes	23
Advertise with support from faculty and campus partners	24
Forming tentative groups based on preferences	25
Finalizing groups during the launch session	26
Institutionalization Phase	27
Getting buy-in	28
Course structure	29
Tutors and Grading	30
3. Resources	31
ERG Resources	32
Bibliography	33
Acknowledgements	34

1 The Why, What, and How of Exploratory Reading Groups

WHY should I run *exploratory reading groups*?

Fostering *creativity, curiosity, and motivation* to support a diverse computing workforce of the future

Computation has quickly become a crucial part of nearly every industry, resulting in an unprecedented demand for a workforce that can apply computational skills to diverse societal problems. To meet this demand, many initiatives have been introduced to improve computing education, for instance, through initiatives for teaching programming. Yet, while teaching skills is certainly important, developing the **creative ability** to apply these skills to real-world societal problems and fostering **curiosity and motivation** in the process are equally important for broadening participation to more and more-diverse students in the computational workforce of the future and for developing technology for the public interest.

UREs are an effective way of doing so, but are offered to just a select few – due to many *misalignments*

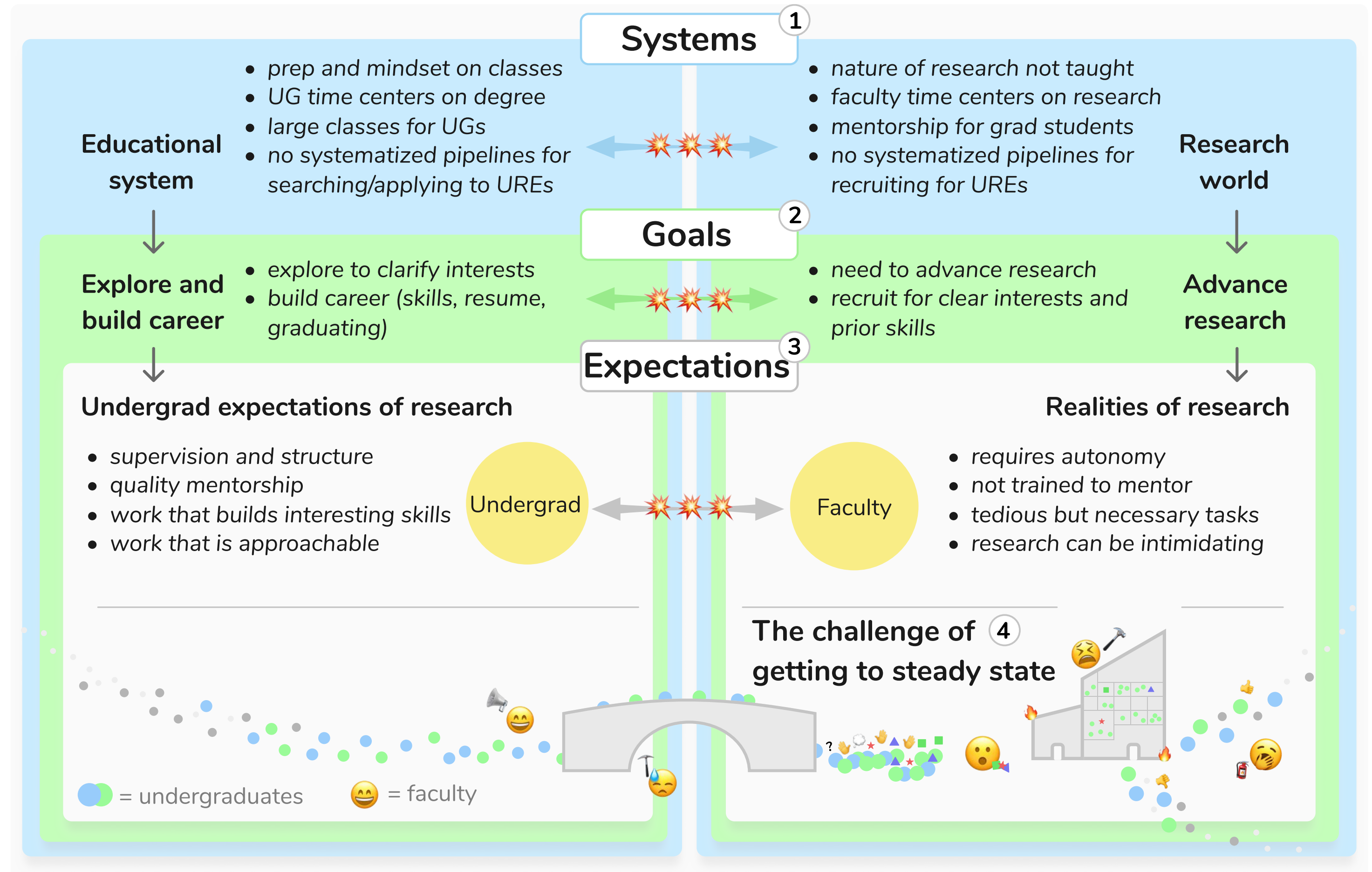
Undergraduate research experiences (UREs) are one effective way to provide this type of learning, and have been shown to increase confidence and retention, and foster community and inclusivity, particularly for underrepresented students in computing. Unfortunately, at large institutions, opportunities for UREs are ad hoc, limited in number, and typically only accessible to upperclassmen in their third or fourth years. Through conducting and analyzing interviews with computing faculty, we've uncovered four main themes that help us understand these barriers through the lens of **misalignments**, explained in *Fig. 1*.

So, what can we do to offer this kind of learning to *all* undergraduates?

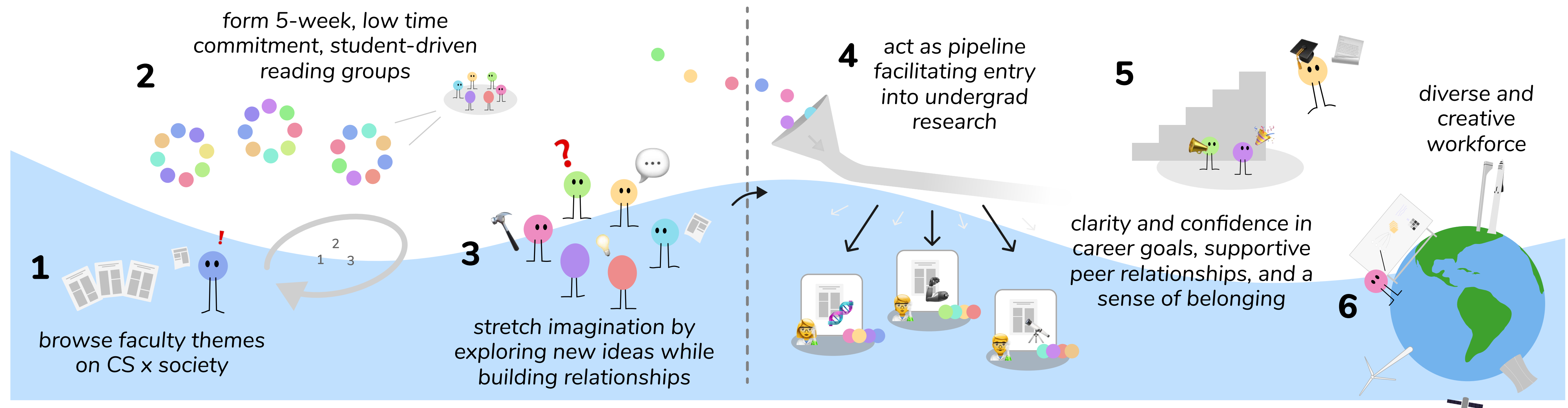
Given that we need to teach the more creative, curiosity- and motivation-driven aspects of computing in order to support the workforce of the future, and that UREs are an effective but limited way of doing so... Is there something else we can do to offer this kind of learning to *all* students – including those earlier in their careers and those belonging to underrepresented groups in particular?

WHY (continued)

Figure 1. *The many misalignments that result in barriers to UREs.* Starting at the systems level (1), misalignments between the educational system and research world introduce significant friction to undergraduates participating in research. These system-level tensions contribute to further misalignments in the respective goals of undergraduates and faculty (2), with students wanting to explore and build their career and faculty wanting to advance research. Misalignments in systems and goals compound to cause misalignments between undergraduate expectations of research and the realities of research (3). Faculty seeking to involve undergraduate students need to bridge these differing systems, goals, and expectations, but encounter the challenge of getting to and maintaining steady state (4), with organizational efforts needing to be personalized and updated to an ever-changing pool of students.

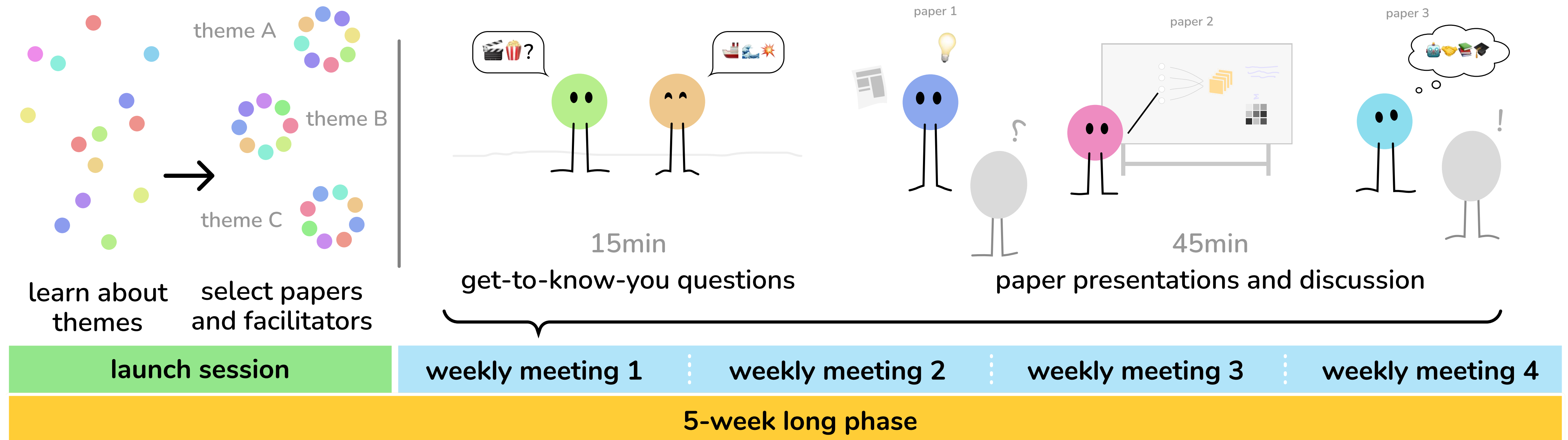


WHAT are *exploratory reading groups*?



To impart this kind of learning to *all* students we created Exploratory Reading Groups (ERGs). At a high level, ERGs are a program that works both as an *alternative* to UREs, providing students with a lightweight way to try out research, as well as an *enhancement* to UREs themselves, acting as a pipeline directly into research labs. Twice each quarter, 1) students browse themes relating CS to society, 2) form five-week, low time commitment, student-driven reading groups, and 3) stretch their imagination by exploring new ideas while building relationships through short activities. This has 4) helped facilitate entry into UREs themselves, 5) led to greater clarity and confidence in career goals, supportive peer relationships, and a sense of belonging, both of which 6) support a diverse and creative workforce.

HOW do *exploratory reading groups* work?



ERGs operate in five-week* long phases, two per quarter. The first week is a launch session, where students learn about the program structure and our goals and expectations. After forming groups of 6 to 10 students, each group spends time getting to know each other, determining meeting times, scheduling paper presentations, and electing a facilitator. In the remaining four weeks, students meet for one hour per week. The first 15 minutes are spent on "get-to-know-you questions" chosen by the presenters. The remaining 45 minutes are spent on presenting and discussing papers. Since each person presents one paper per phase, there are 2 to 3 papers per meeting, for as little as 15 minutes per paper, including a concise summary of the key ideas followed by questions, reactions, ideas, and brief discussions.

* When running ERGs as a cocurricular activity, we recommend four-week long phases (with three weeks of presentations) so that there is a lower time commitment and a little breather for midterms and finals. What you don't want is some students dropping mid-phase, resulting in a subpar experience for everyone else.

HOW (continued)

Exploratory Reading Groups are a simple intervention, but their *lightweight, scalable, and relational* design enables them to seed just the right relationships and reduce just enough friction to effect change.

Lightweight

Very low time commitment

The lightweight nature of ERGs circumvent barriers of limited faculty and student time, and meet student goals of exploration in ways that don't clash with the faculty who need to advance their research. With such a low barrier to entry even busy students can participate, and if they're just wanting to try out research, they don't need to jump through hoops or commit to a longer term research position. Afterward, because themes are directly connected to labs, students that *do* apply for a URE have greater clarity of and match in interests.

Scalable

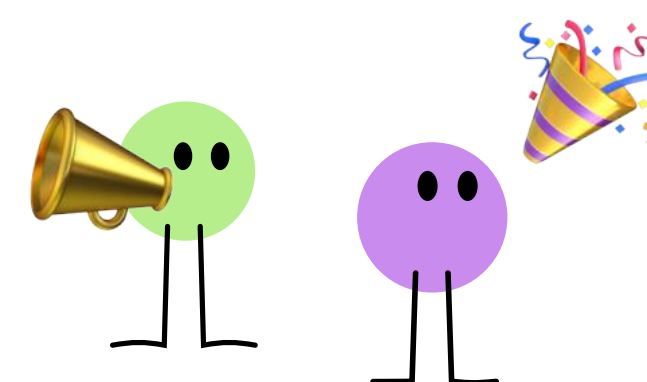
Resource-light and student-driven

ERGs are highly scalable because they require very little resources, just an internet connection and a place to meet. They are almost entirely student-driven, faculty only need to host a launch session and propose themes since students explore papers on their own. This enables ERGs to be accessible to many students – *not just a select few* – and thrive in the resource constrained environments of nearly any institution.

Relational

Intentionally intimate

From the beginning, with their small group sizes and “get-to-know-you questions”, ERGs were intentionally designed to be intimate. Students feel a greater sense of belonging, support each other academically and emotionally, and make connections with others already working in labs, giving them opportunities for networking, knowledge about the realities of research, and encouragement to apply.



PRELIMINARY IMPACT

Exploratory Reading Groups are just getting started, but we've seen them have a *BIG* impact on students.
(All quotes are pseudonyms).

Confidence and
clarity in career
goals

“ I don't feel entirely comfortable
getting a job as of right now. . .
There's also, potentially, I might
want to get into research too... ”

Cody, in his first quarter of college,
after 4 weeks in ERGs



“ I feel a lot more confident with
research, I think that's
probably where I want to go. ”

Cody, after 12 weeks in ERGs

Less intimidating
view of CS

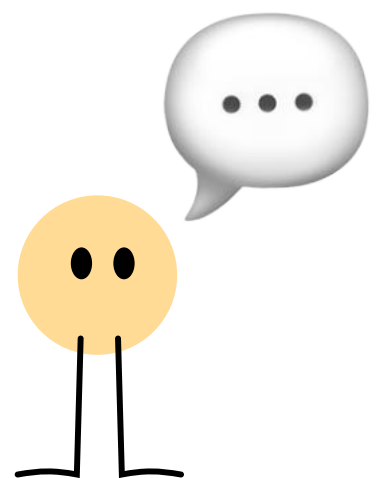
“ ...the people that I was in a reading
group with [were] very confident
about their choice [to pursue CS]... I
learned that CS is applicable to a lot
of different fields... [it] definitely
cast a positive light on what I think
about CS... I always thought CS was
intimidating... but now I'm more
open to it. ”

Emma

Discovery of
personal
connections

“ I didn't expect to learn like, such
interesting topics that, like, I personally
cared about ...there's something about...
using technology to help... immigrants...
integrate more with the economy... I really
liked that aspect of it. Because I noticed
being a first generation Persian American
there is a lot of separation... with your
neighbors or your friends... ”

Amir



PRELIMINARY IMPACT (continued)

Comfort and sense of belonging

“...all of the people in my group were studying CS or had a background in CS. I think they made me gain interest in the AI concentration in Cog. Sci. Because before, I was like ‘Oh I don’t know. . .’ (unsure of AI). But like, since they were talking about all the classes they were taking, it felt like they. . . I don’t know... it was a community I liked being a part of.”

Tiffany

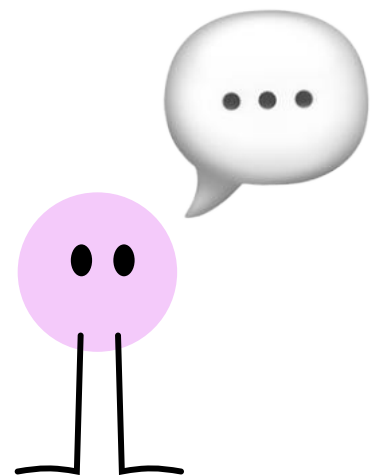
Peer support: emotional and academic

“One of the grad students would [often say], ‘Yeah, I just wonder why my life sucks so much, hahaha.’ ‘Yo buddy, you wanna talk?’ We would just talk afterwards... it was just kind of like a moment like, we’re there. I think we’re getting pretty close.”

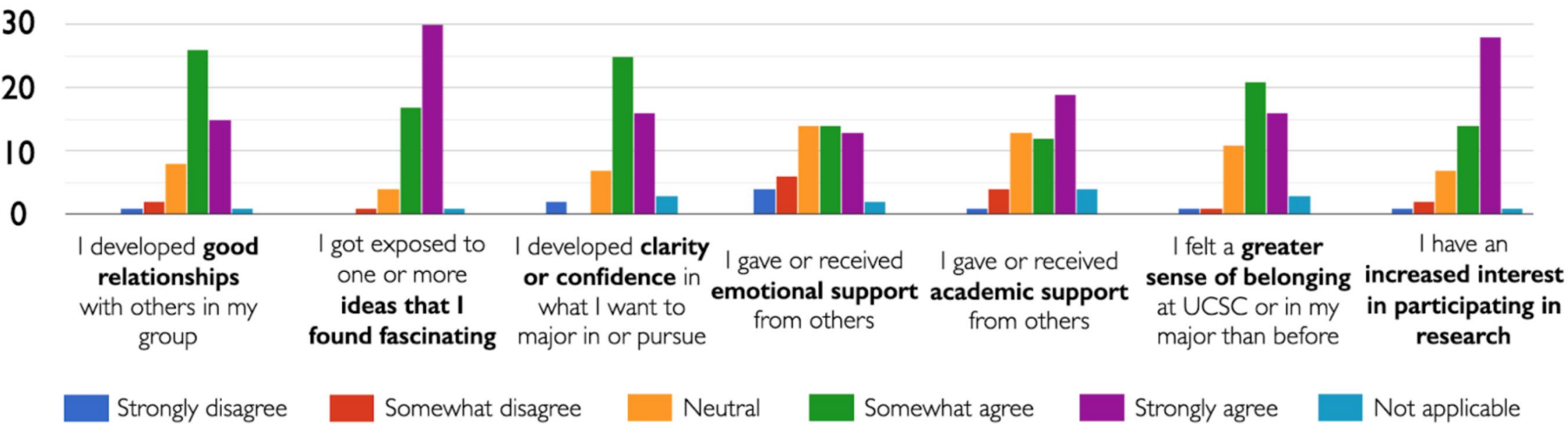
Cody

“...we’re all freshmen so we’re like constantly bouncing questions back on each other, like ‘How is this class?’, ‘What’s your plan?’ My last group was a little more of a stretch, because it was like, I was a freshman, and there [were] like two grads, two juniors, it was a bit more of a gap, but I felt close enough to them to ask for help on stuff.”

Cody



PRELIMINARY IMPACT (continued)



Most recently, we have institutionalized ERGs at UCSC as a 1-credit course and have attracted the support of divisional leadership for deploying across the division, with the eventual goal of a reading group for every faculty. Here are some results from a survey of 53 students at the conclusion of the course in Spring 2022 regarding their experiences and the value they gained from participation.

2 How to set up Exploratory Reading Groups

Startup

Growth

Institutionalization

Startup Phase

The startup phase is a good place to start when you are a single faculty member trying out Exploratory Reading Groups as a cocurricular program within your own lab.

This phase centers on figuring out themes that work well, ironing out logistics for recruiting on your campus, and making any necessary adaptations to the weekly structure.

- 1 Define reading group themes
- 2 Advertise to students
- 3 Running the launch session
- 4 Weekly meetings
- 5 End-of-quarter debrief

Startup

Define reading group themes

Reading group themes should be a research area that a **faculty member is actively working in** (in this case, you!). They should also be framed to be **societally relevant or engaging to students**.

Curate a list of 9+ readings sufficient for 2-3 papers a week for 3 weeks of discussions. Include one of your own papers if possible. Ideally **define at least 2 themes** for use in Weeks 1-4 and 6-9.

Checklist:

- Title and description framed to connect to students,
- Sponsoring faculty actively working in the area,
- Set of 9+ readings for students to choose from,

Notes:

- It’s ok if papers are technically dense if they are well-written so that students can get the big ideas. The focus is broad exploration, so a paper is a good fit if it will expose students to new ideas and stimulate them.
- We’ve mostly used conference papers, which are a more manageable length than journal articles.
- We’ve also successfully had students choose from a large pool of papers (e.g. of 2 faculty in the area) rather than follow a fixed reading list and schedule.
- After institutionalizing them as a 1-credit course, we do 5 week phases, but while they are cocurricular, we’ve found that 4-week phases (with 3 weeks of discussions) works best.

Here are some examples of reading groups:



and



Future of Work and Education

D Organizer
David Lee



Games and Learning

E Organizer
Eddie Melcer



Socially Expressive Robots

L Organizer
Leila Takayama



VR and Data Science

A Organizer
Angus Forbes



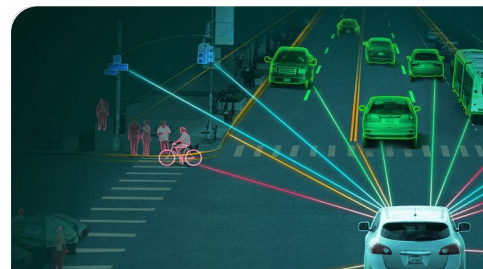
Sustainable Sensor Networks

C Organizer
Colleen Josephson



Fairness in AI

Y Organizer
Yang Liu



Autonomous Vehicle

J Organizer
Jim Whitehead

Startup

Advertise to students

During the startup phase, recruiting enough students should be fairly easy. Share in your classes, with students interested in your lab, and through relevant campus newsletters and organizations.

Checklist:

- Copy and modify provided templates and graphics,
- Compile a list of campus newsletters and organizations,
- Share at least 2 weeks before the start of each phase,

Notes:

- Though it will feel tedious tracking down all the newsletters and organizations (including on Facebook or Instagram), you just have to do it once, so it's worth it! Just create templates that you can reuse each quarter.

Come join

Collectively Reading Groups

Launch Meeting
Thurs, April 11th
E2-506 @ 6:30pm

RSVP Online
collectively.soe.ucsc.edu

The *Tech4Good Lab* is organizing reading groups for exploring social computing, the intersection of computation and human interaction. All students from freshman to PhDs are encouraged to join! Visit our website for more info and to RSVP for the launch meeting.

Industry
Understand how designers and engineers approach complex problems

Research
Strengthen skills that prepare you for seeking future lab positions

Relationships
Meet other motivated peers that share common interests

Come learn about topics such as:

- artificial intelligence
- economics
- psychology
- math
- sociology
- human-computer interaction
- education
- crowdsourcing

and much more!

This is an example flyer that we posted physically around campus and online to the various channels mentioned. Feel free to use and remix.

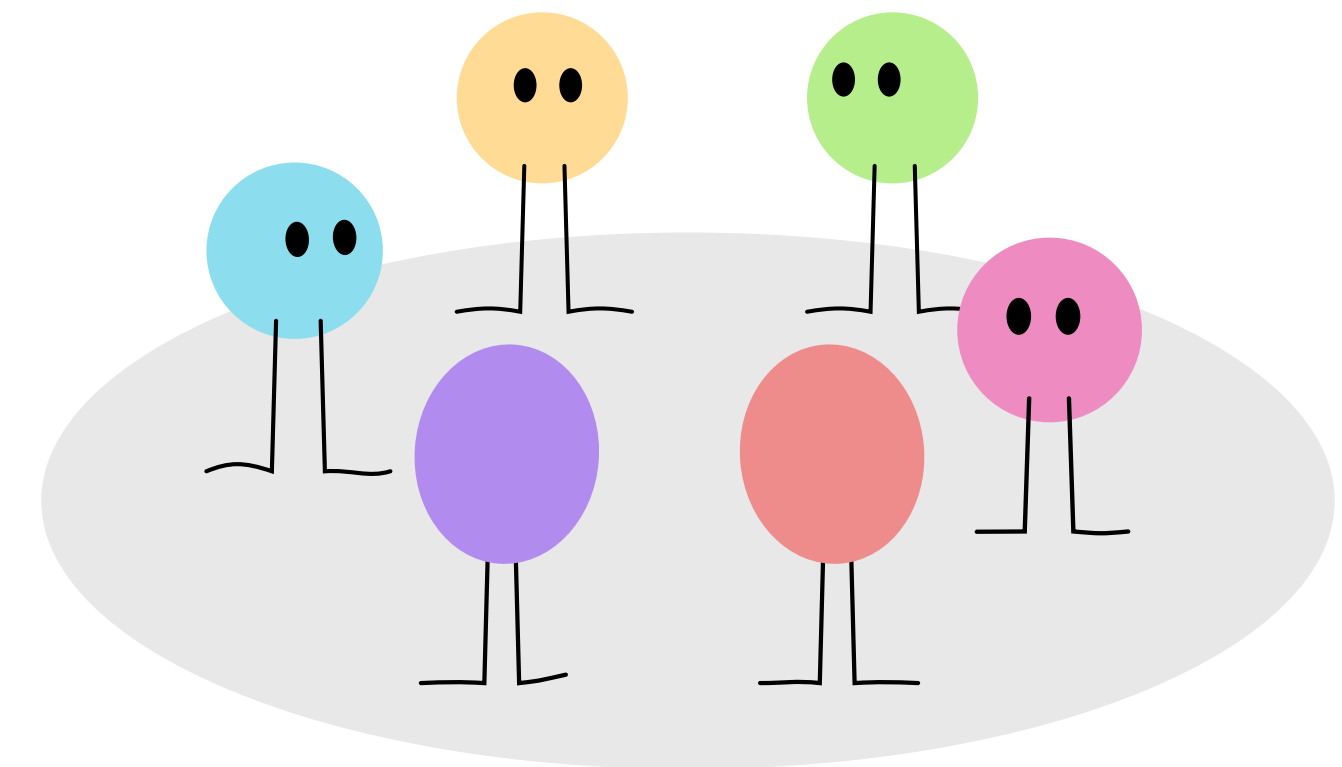
Startup

Running the Launch Session

In the launch session, you'll want to **introduce how ERGs work**, **set the norms for participation**, and make sure **logistics are set up**. Even though you won't have to form groups around multiple different themes (as you would in the later Growth and Institutionalization stages) hosting a launch session in Startup is still very important.

Checklist (1/2):

- **Introduce how ERGs work**
 - Explain the basic structure (4 week phases = 1 launch session + 3 weekly group meetings)
 - Reassure beginners – make sure students know it's totally okay if they have no research experience (we're here to learn!)
 - Show students how to read a research paper – many students have never seen a research paper before so you'll want to go over the basics (check out our guide for details)
- **Set the norms for participation**
 - Require commitment – because the program is so lightweight, if students sign up to participate, they should be *fully* committed
 - Normalize relationship building – for example, if hosting ERGs remotely, students should default to webcams on whenever possible



Startup

Running the Launch Session (continued)

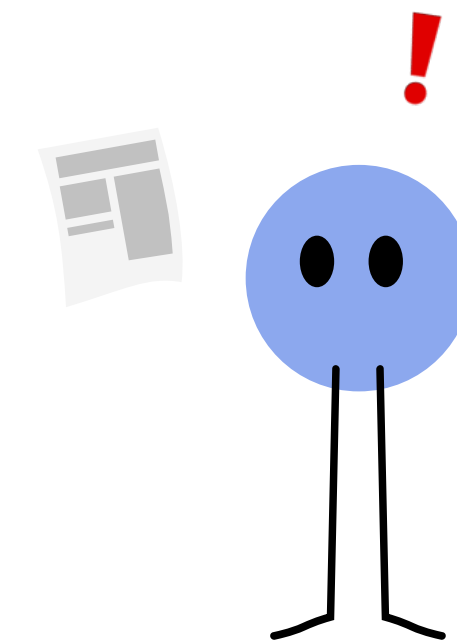
Checklist (2/2):

- **Set up logistics**

- Begin with GTKY questions – once in a group, warm everyone up with a few “get-to-know-you questions” (explained on next page),
- Establish communication channels – set up a group chat where everyone will communicate, we recommend text messaging,
- Find a meeting time and place – secure a time and place where everyone can meet for one hour per week, we’ve even made an app for easier group scheduling called *timely* which you can use at timely.soe.ucsc.edu,
- Students elect a facilitator – the facilitator is someone who’s in charge of making sure that weekly meetings run smoothly. Beforehand, this means reminding upcoming presenters of their responsibility, and in meetings, this means initiating GTKY questions, provoking discussion, moving conversations along, and fairly involving all participants,
- Select papers and set a presentation schedule – lastly, students should spend some time browsing through the list of curated papers to see which piques their interest and then sign up to present this paper in one of the weekly meetings.

Notes:

- It’s very important that students are *fully* committed because even just a couple of absences can have a ripple effect causing others to not show up, making the group fall apart.
- We recommend communicating via text messages in particular because it has been the most reliable, email or online messaging platforms can work but risk slower response times or no responses at all if apps are not installed or notifications are not set up properly
- It sounds simple, but it is *crucial* that all of these setup logistics are completed *before* the end of the launch session, if left to occur “later”, groups almost always fail to get started.



Startup

Weekly Meetings

Weekly meetings are where the real magic happens. In each hour-long meeting, students spend **15 min on “get-to-know-you” questions** and the remaining **45 min on paper presentations and discussion**. Assuming 3 papers and 15 min presentations, this breaks down to ~5 min for the summary presentation and ~10 min of discussion.

Checklist:

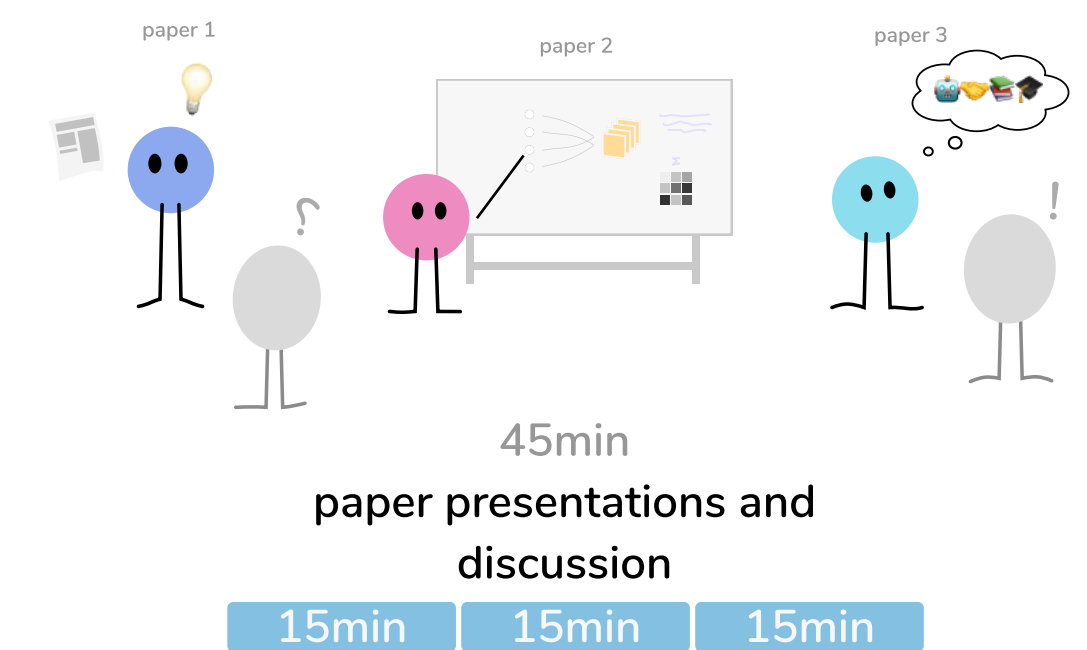
- Do “get-to-know-you” (GTKY) questions – a fun little activity that helps students feel comfortable with each other and ultimately enables richer interactions. The presenters for the day each propose one question for everyone to answer, with just one rule: you must be the first to answer your own question. Questions range from “How was your day?” to “When was the last time you cried?”
- Present paper summaries – the presenters for this week should have read their paper beforehand and will now summarize it for others who have not read the paper. See our paper summary template for specifics on what we recommend students talk about.
- Discuss papers – after each summary, everyone can discuss anything they want related to the paper, e.g. ideas it sparked, impact on society, personal connections, etc.

Notes:

- The facilitator plays an important role and should be *actively* guiding the groups activities and conversations.
- We considered removing GTKY questions to make room for more “important” activities, but kept them in after finding that students highly value them for the relationships and friendly environment they create.
- Don’t worry if students aren’t getting the nitty gritty details, so long as they are engaged. Remember, the purpose is stimulating creativity, developing purpose for learning, and fostering supportive relationships.
- Although normally not required, when starting out, participate in a few group meetings to see how things are running firsthand.



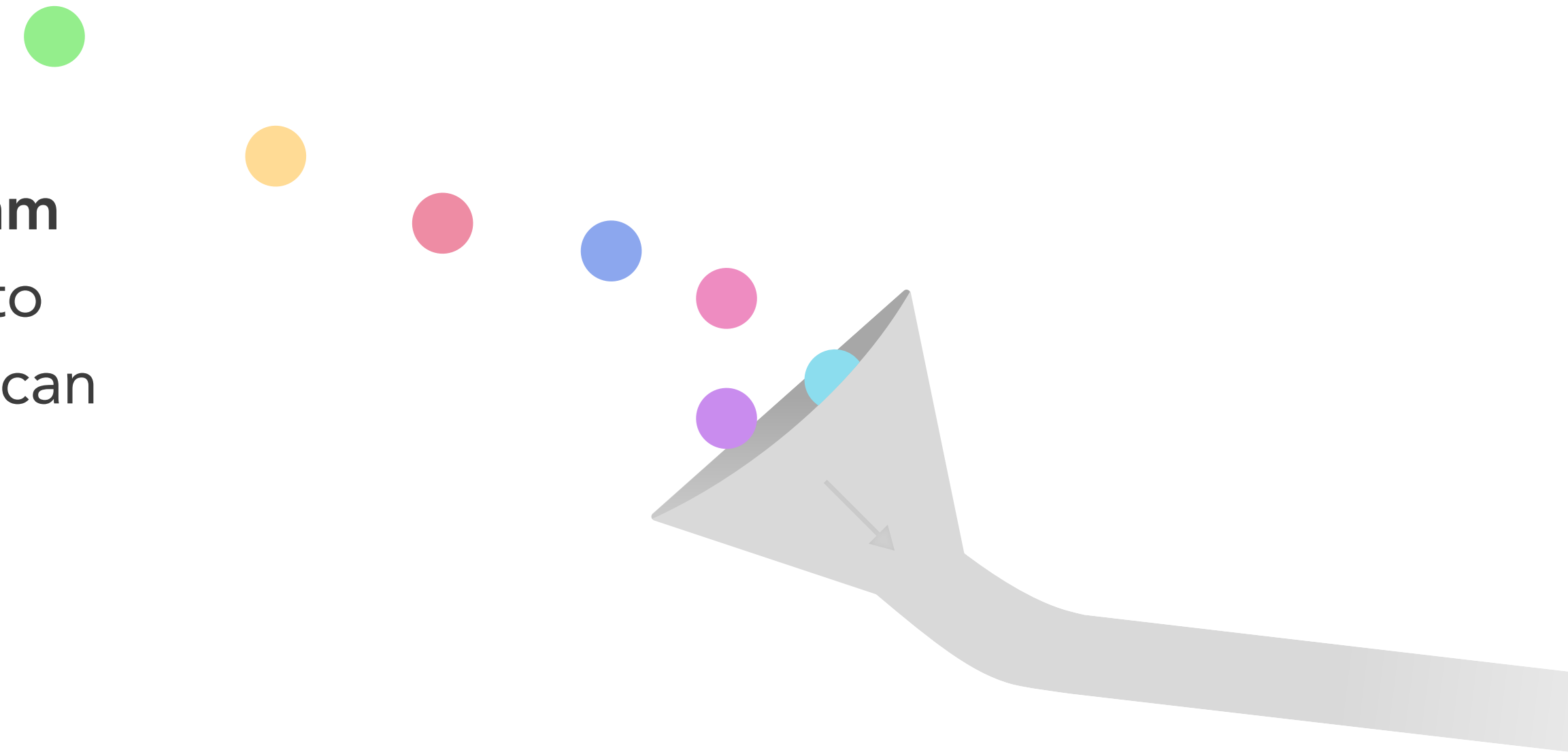
+



Startup

End-of-Quarter Debrief

At the end of the quarter, do a debrief to **see how the program went**. Additionally, since ERGs act as a pipeline of students into research labs, **provide students with next steps** on how they can apply for your lab.



Checklist:

- Join the last group meeting to connect with students and see how their experience was,
- Provide them with next steps for applying to your lab,
- And next steps for participating in another phase of the reading groups.

Notes:

- A debrief is particularly important if this is your first time running ERGs because you'll want to know if things aren't going well
- Also, consider having someone from your lab join the reading groups throughout the phase as a sort of participant observer so you'll know right away if any adjustment is required. Later, once you get a hang of the groups, you can have this person just join week 1 to make sure groups are off to a good start.

Growth Phase

Once you have at least one group running smoothly, expand to additional faculty interested in building a pipeline into their lab, which will help to grow awareness on campus.

This phase centers on growing to additional faculty, spreading awareness through the involved faculty, and getting comfortable handling group formation.

- 1 Recruiting more faculty
- 2 Setting up new faculty themes
- 3 Advertise with support from faculty and campus partners
- 4 Finalizing groups during the launch session

Growth

Recruiting more faculty

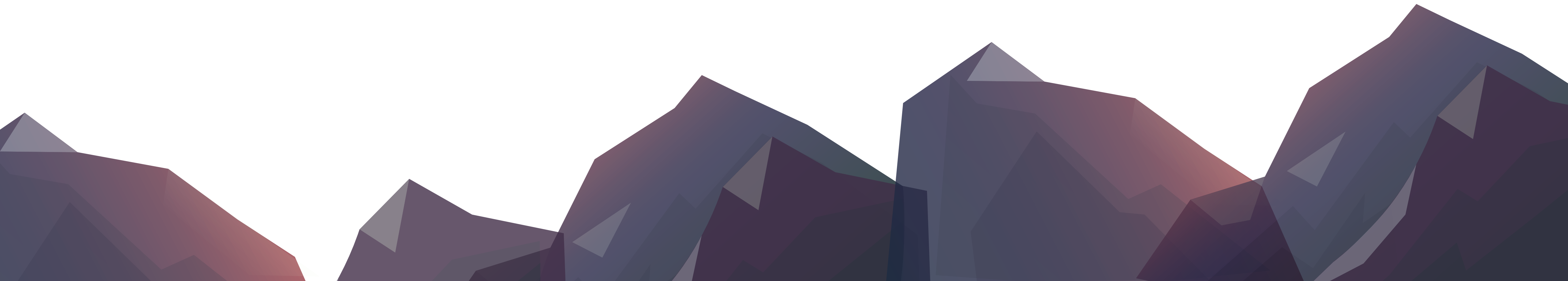
Reach out to faculty mailing lists, those you know, and new hires. Emphasize that it's a low time-commitment, one-time effort that will provide an ongoing pipeline of students into their lab, but don't feel a need to push too hard. There will be some faculty who are interested and it's better to grow gradually starting with those who are most motivated.

Checklist:

- Copy and modify provided advertising templates and graphics,
- Share at least 4 weeks before the start of the quarter,
- As faculty fill out the interest form, they will be sent instructions for setting up a theme to submit by 2 weeks before the start of the quarter (see next page),

Notes:

- We've found that "early adopter" faculty tend to be new hires, those trying to recruit students for skills **outside** of the courses they teach, and faculty in research areas that commonly work with many undergraduate students.



Growth

Setting up new faculty themes

This is similar to setting up your own reading group theme, but now you need to get others to do it. We have a “homework assignment” and form that guides faculty in setting up and submitting their theme a few days before advertising to students. Beyond collecting information on the theme itself, you’ll also want information on potential research positions so that students have realistic expectations of opportunities.

Checklist:

- As faculty fill out the interest form, they will be sent instructions for setting up a theme to submit by 2 weeks before the start of the quarter,
- Send them a reminder a few days it’s due,
- When you aggregate the entries into a student-facing list of themes, share it with participating faculty.

Notes:

- Faculty are busy, so it’s common for faculty to express interest and then fail to follow through. A simple reminder helps, but if you have 2 new faculty already, I wouldn’t worry too much as they can always join in future quarters,
- Sometimes faculty don’t fully complete the theme setup. I’ve found that after they see that it’s been sent out to students, they will sometimes go back and make updates.

Sustainable Sensor Networks



Colleen Josephson
Assistant Professor, Electrical & Computer Engineering

11 people

Description. Sensor networks are an important tool for measuring air and water pollution, soil conditions, and other important environmental factors. However, the impact of the sensors themselves as well as the infrastructure that supports the collection and analysis of sensor data needs to be considered. This reading group explores research on the design and deployment of sensor networks, with a focus on improving sustainability.

[Paper Reading List](#)

Future research opportunities. We’d love to have 1-2 undergraduates continuously involved. The ideal candidate has some programming experience (some combination of MATLAB, Python, C), some basic EE bench knowledge, and embedded systems experience. Experience with software like Altium or Eagle a plus.

Growth

Advertise with support from faculty and campus partners

A great benefit of involving more faculty is that you can ask participating faculty to advertise the reading groups to classes they teach and to students they are unable to take into their lab. We've found this to be particularly effective. Additionally, partnering with diversity programs and asking them to intentionally encourage participation is crucial for increasing participation from underrepresented students.

Checklist:

- Copy and modify provided templates and graphics,
- Compile a list of campus newsletters and organizations,
- Ask faculty and campus diversity programs to forward your ad,
- Share at least 2 weeks before the start of each phase,

Notes:

- If there are not many students interested in a particular faculty's theme, you can also let that faculty know as they will have a natural incentive to help share with others.
- You'll note that our outreach materials emphasize both the value for those interested in research as well as those aiming to go into industry. There are many! (exposure to interesting ideas, relationships with similarly motivated peers, something to talk about in job interviews, etc.)

Growth

Forming tentative groups based on preferences

Once you have more than one theme, a major challenge is forming stable groups (as some people express interest, but then drop). We handle this in two stages. Before launch, we form tentative groups and send them to students to begin picking papers. During launch, we set norms for participation and finalize groups (see next page).

We form tentative groups based on the likelihood of taking the class ("I am almost definitely going to be taking the course" versus "I plan to decide/evaluate after the first lecture") and student rankings and ratings of themes (ratings are one of "Would love this!", "This seems interesting", "Not excited, but ok...", and "Please not this one!").

Checklist:

- Form tentative groups based on submitted preferences in the recruitment survey
- Email the groups to students and ask them to begin picking papers for their assigned themes before the launch session,

Notes:

- You will likely want to spread out students who responded "I plan to decide/evaluate after the first lecture" to minimize the chance that a bunch drop from the same group,
- It's important to assign students to themes they want to be in. Otherwise, it defeats the purpose of exploration and facilitating entry into faculty research labs,
- We have been able to assign almost everyone to reading group themes that they rated "Would love this!". We have never had to assign people to themes that they rated "Please not this one!" or even "Not excited, but ok...".

Growth

Finalizing groups during the launch session

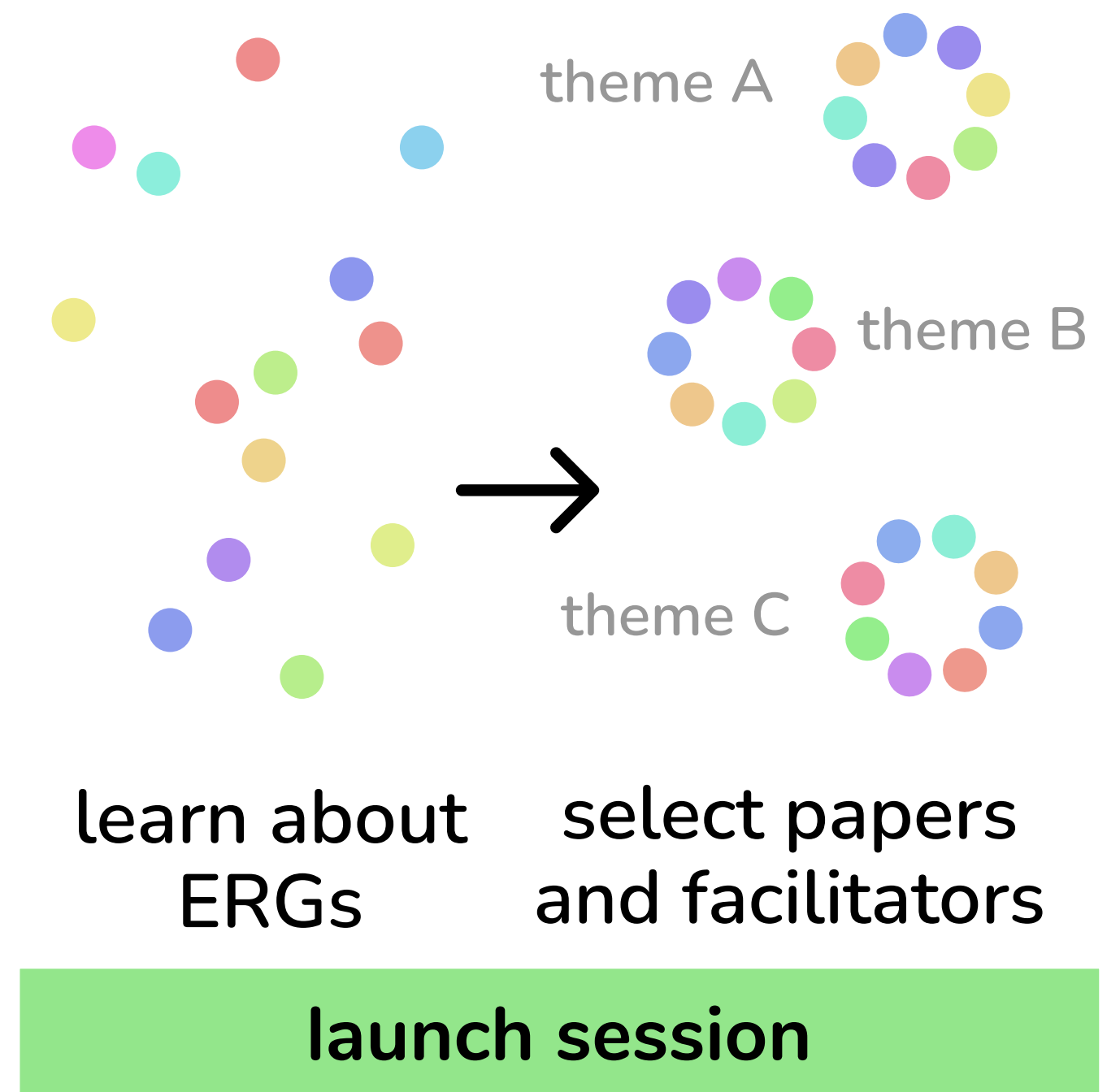
If people sign up after you've created tentative groups, hold off on adding them to groups until the launch session. During the launch session, set norms and ask students to commit to the entire phase (only 3 more weeks) if they join. Then ask people to gather with their group so that you can make adjustments as needed. Make sure that all groups finalize logistics before leaving and begin getting to know each other.

Checklist:

- Ask people joining late to come to the launch session and join a group after you know which groups need more members,
- Have students pick a facilitator, schedule paper presentations, set a meeting time and location, and get to know each other,

Notes:

- After we know how many people are committing to each group, we then begin adding people who signed up after we had already formed tentative groups. We start adding students who are interested in groups that have more space.
- It's important to run a launch session and re-form groups between each phase. This gives busy students a chance to drop out without impacting their group, and to ask those who are continuing to recommit to seeing the entire phase through. As said in the startup phase, while you are still running ERGs as a cocurricular activity, we recommend having 4-week phases (one week for launch and 3 weeks for discussions).



Institutionalization Phase

As you get support from leadership, institutionalization (e.g. as a 1-credit course) can help with logistics, resources and recognition.

This phase centers on growing to additional faculty, spreading awareness through the involved faculty, and learning to handle group formation.

- 1 Getting buy-in
- 2 Course structure
- 3 Weekly meetings
- 4 Tutors and grading

Institutionalization

Getting buy-in

Establishing ERGs as a 1-credit course has benefits such as reducing mid-phase dropouts and access to grader/tutor resources. Use ongoing recruitment emails to naturally raise awareness of your program's growth and impact, and find an ally!

Checklist:

- Include growth and impact metrics as you send out recruitment emails, as well as a list of other faculty participants,
- As senior faculty in your department or faculty with administrative roles establish themes, reach out to ask them about institutionalization,
- Identify faculty and administrators who are deeply invested in diversity and student success

Notes:

- Everyone will have their own style, but I tend to like letting awareness grow naturally rather than trying to force something. If you are like me, adding growth and impact metrics into your recruitment emails is a great technique because they naturally fit in with motivating more faculty to participate, while also having a great side effect of growing awareness.



Institutionalization

Course structure

Use the lowest unit count possible so that you can retain the value of Exploratory Reading Groups as a very lightweight option for student exploration. Once approved, some adjustments you will likely want to make compared to the cocurricular version are to have a fixed meeting time and location and to have longer phases (since you can now mandate weekly attendance).

Notes:

- We've found it help to obtain a fixed meeting time and location through the registrar's office so that you don't have to deal with any scheduling logistics (all students who sign up are guaranteed to be able to make the time). However, if you don't like the idea of restricting participation, it's probably ok to still let some groups pick their own time and location. But if you do, make sure they fix the time and location during the launch session.

Checklist:

- Get the paperwork approved for the lowest unit count,
- Obtain a scheduled time and location from the registrar's office,
- Set up the syllabus to cover the entire term, e.g. for a quarter system, Weeks 1-5 and Weeks 6-10 for Phases 1 and 2 respectively.



Institutionalization

Tutors and Grading

Now that it is no longer co-curricular (which self-selects for those with strong intrinsic motivations), it's important to grade for attendance. We also ask students to skim papers and submit questions even in the weeks they are not presenting. For presentations, we grade them on a simple Check+, Check, Check-, Minus basis. This makes it possible to easily handle with minimal tutor/grader resources.

Checklist:

- Use provided forms for attendance, presenter submissions, and non-presenter submissions,
- Recruit tutors/graders from students who have been through ERGs and joined a research lab,
- Make sure that student facilitators submit attendance and that tutors input attendance grades into the Learning Management System (e.g. Canvas) immediately so that students know starting in Week 1 that you are serious about the mandatory attendance,
- If helpful, use the provided rubric for grading presentations on a Check+, Check, Check-, Minus basis.

Notes:

- When we first institutionalized, we thought that we no longer needed each group to nominate a student facilitators because we thought that the presenters could be responsible for facilitating their discussion as part of their graded responsibility. However, this didn't work since not every student will be good at that. So we strongly recommend still having groups choose a facilitator during the launch session (see provided resources for facilitator responsibilities).

3 Resources

Resources

ERG Resources

Let us know if you are interested in implementing ERGs at your institution at tech4good.soe.ucsc.edu/#/exploratory-reading-groups, and we will be more than happy to send you all the resources we have (see list on right). Some of these are ready now, others are being cleaned up or finalized. We may also have staff resources to support you in some logistical tasks, as we are applying for funding to scale ERGs more broadly.



Startup

- Email Templates for Student Recruitment
- Advertisement Flyer and Handout Designs
- Reading Group Theme Syllabus Example
- Launch Session Slides
- Student “How to” Guide
- Example Student Presentations

Growth

- Email Templates for Faculty Recruitment, Faculty Support in Advertising, and Launch Information
- Faculty Theme Setup Instructions
- Faculty Theme Setup Submission Form
- Faculty Themes Overview Template
- Student Interest and Preference Form
- Theme Assignment Spreadsheet

Institutionalization

- Exploratory Reading Groups Syllabus
- Attendance Form
- Presenter Form
- Non-Presenter Submission Form

Resources

Bibliography

Project Publications

1. Dustin Palea and David T Lee. 2021. Exploratory Reading Groups: A Scalable Approach to Creative, Relational, and Student-Driven Exploration in CS Education. *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education*, 837–843. <https://dl.acm.org/doi/abs/10.1145/3408877.3432394>
2. Rhea Sharma, Atira Nair, Ana Guo, Dustin Palea, and David T Lee. 2022. “It’s usually not worth the effort unless you get really lucky”: Barriers to Undergraduate Research Experiences from the Perspective of Computing Faculty. *Proceedings of the 2022 ACM Conference on International Computing Education Research V. 1*, 149–163. <https://dl.acm.org/doi/abs/10.1145/3501385.3543976>
3. Dustin Palea and David T. Lee. 2022. How Lightweight, Scalable, and Relational Learning Experiences Can Help Overcome System-Level Challenges in Education. *AAAS IUSE The Disruptor Blog*. <https://www.aaas-iuse.org/lightweight-scalable-relational-experiences>

Acknowledgements

Designing the Exploratory Reading Group Program has been a multi-year endeavor with many twists and turns. Many mentors, students, faculty, and staff have contributed their time and perspectives and we are tremendously grateful for all their contributions and support.

We want to thank our NSF IUSE Program Director Stephanie August for being the first one to believe in this project and supporting it to make it a reality. Without her support, not only would this project have never gotten off the ground, but the Tech4Good Lab as a whole with all of its other student programs might never have happened. We want to thank our external advisor Rebecca London for very helpful guidance when we were just beginning to undertake design-based and qualitative research for the first time. We would like to thank Dean Alexander Wolf, Associate Dean Jim Whitehead, Chair Sri Kurniawan, Director of Student Excellence, Engagement, and Inclusion and the MESA Engineering Program Carmen Robinson, and Professor James Davis for supporting the program's growth and institutionalization. We would like to thank the staff who helped with advertising, paperwork, hiring, and so much more, including Lindy Boisvert, Elaina Boncich, Andrea Taylor, SE Chun, Emily Gregg, Leah Kahn, Maria Walker, and Denise Goss.

Finally, we want to thank the many undergraduate student collaborators who helped to shape the program and the research surrounding it. These include coauthors of our publications, Rhea Sharma, Ana Guo, and Ryan Anderson, and the students that helped with running the reading groups or designing and developing a (still in-progress) platform for running ERGs, including Nicolle Ayon Campos, Hsien-Yu Chen, Ivy Chen, Gurdikhia Kaur, Ivy La, Tiffany Lee, Thomas Raffill, Veronica Rivera, Justin Yu, Mingrui Yu, Elizabeth Dinh, Aitanna Parker, Henry Slayer, Egan Bisma, Tim Tang, Nisha Charagulla, Brittany Lei, Tomohiro Shimada, Sarah Avila, Kayla Bowler, Allison Truong, Eliza Gonzales, Charita Mangina, Marissa Lewellen, Melanie Wong, Garrett Leising, Krishna Pandian, Mathew Raju, Anish Kumar, Aditya Pooruli, Yaman Inamdar, Yijie Zhu, Karthi Sankar, Sabrina Sin, Michael Lee, Joshua Cho, Ajay Bhatia, Radhika Gadre, Daniel Chan, Ria Dinesh, Jessica Kuang, Anish Kumar, Gordon Yee, Christian Delos Santos, Rina Munakata, Raghavendra Raikar, Upasana Halder, Ali Zaidi, Sheyla Aviles, Shreya Sundar, Nick Wang, Bhaswati Das Gupta, Arya Das, Leejin Kim, Naysa Chopra, Aaron Wu, Sai Skyam, Jeremy Lin, Michelle Sheu, Yukti Malhan, Sayak Datta, Jason Ohanaga, Justin Lee, Parmpreet Gill, Animesh Tiwary, Calum Chan, Neil Bisht, and Fernando Chau.

This research was funded by the National Science Foundation under Grant No. 1807388, and Dustin was also partially supported through the Spencer Foundation under Grant No. 202000030.

Illustrations are taken and modified from @uxui on Figma and are copyrighted by 4.0 and have a disclaimer of warranties. Attribution 4.0 International (CC BY 4.0)

License: <https://creativecommons.org/licenses/by/4.0/legalcode> and

Source: <https://www.figma.com/community/file/1095617469892597402>



