

# The Multilevel Research-Intensive Community Creates Equity and Provides an Alternative to Standard Diversity Pipelines

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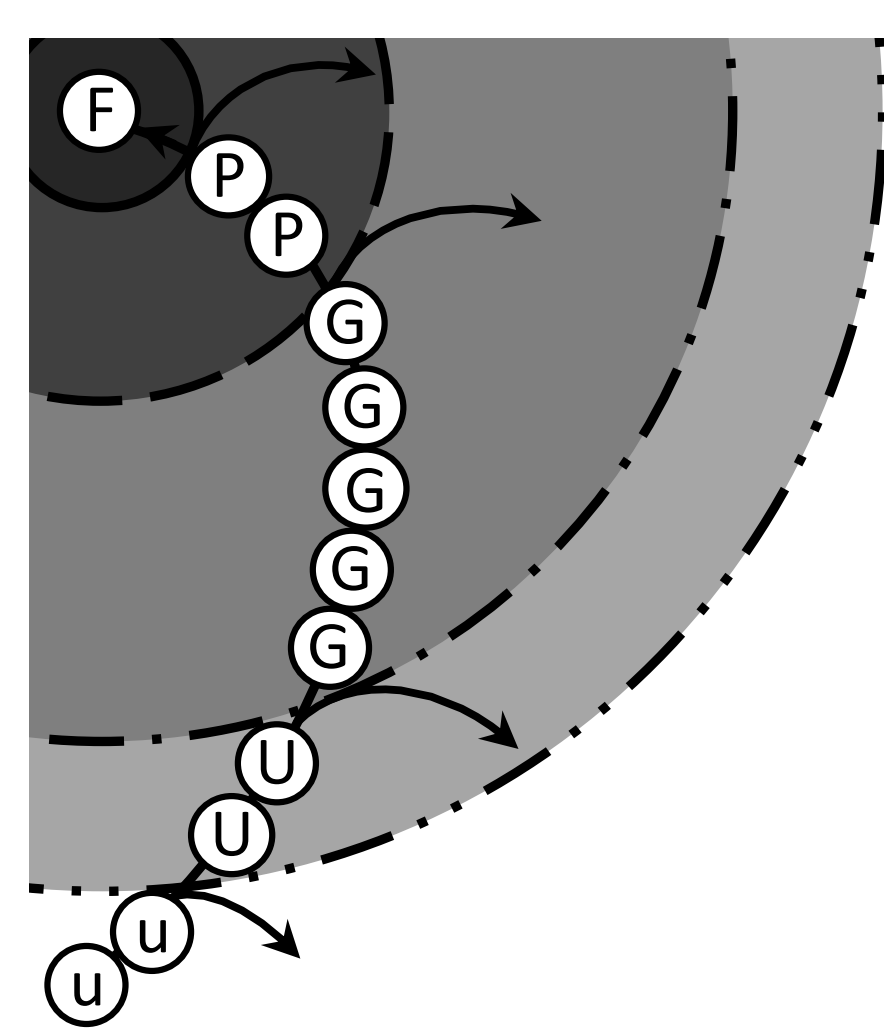


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**ABSTRACT** Inducting lower-division undergraduates into a community of practicing scholars is impeded by boundaries that segregate roles, responsibilities and identities at each academic level. Faculty at universities with large undergraduate populations have difficulty mentoring a significant fraction of undergraduates with standard 1-on-1 research apprenticeship. Research opportunities are thus conserved for students with the most apparent “merit”. With scarcity of opportunities, faculty do not have to advertise opportunities widely, disparately impacting recruitment of underrepresented students with limited social capital. Furthermore, underrepresented students are less likely to seek research experiences in later years if they lacked transformative experiences when career decisions are typically made in the first two years. Faculty filter applicants by establishing easily quantifiable criteria such as completion of advanced coursework, availability, and initial GPA. Use of these poor metrics of research potential have disparate impact on selection of students that have had insufficient preparation in high school, difficulty securing accommodations for disabilities, or need to work to pay for college. Criteria such as GPA and intention to pursue graduate study are perverse criteria because both increase significantly with research experiences. Inability to make informed selections can exacerbate implicit bias, especially in the absence of a track record of success. When working in isolation, students lacking specific knowledge or skills require remediation, which then diminishes retention in the lab in subsequent semesters. Disparate impacts on recruitment, selection, and retention are not manifestations of an unmet need to remediate deficits, but an unmet need for a research education model that removes barriers to participation. The Aggie Research Program (ARP) at Texas A&M is a research-intensive community, based on asset models and leadership. Instead of 1-on-1 research apprenticeship, research is performed by a diverse undergraduate research team led by a graduate student or postdoctoral scholar preparing for the next stage of a research career. Research teams are productive because they further the team leader’s research by leveraging each undergraduate’s unique assets (talents, skills, perspectives, and experiences). Designed to remove institutional, economic, and cultural barriers to participation of underrepresented students, this model “targets within universalism” to achieve equity. First, research teams incur minimal risk to productivity if a potential recruit lacks a particular skill. With “legitimate peripheral participation”, neophytes without a track record can exhibit a growth trajectory. Over the course of multiple semesters, experienced team members become peer mentors to new team members. Team leaders meet in periodically to explore common interests in research leadership. The result will be an organic transition of an underrepresented undergraduate, who has not yet committed to a research career, to a potential faculty member, who creates diverse research education programs.

## Challenge

### Boundaries between academic levels



Inducting lower-division undergraduates into a community of practicing scholars is impeded by boundaries that segregate roles, responsibilities and identities at each academic level

### Problems with 1-on-1 Research Apprenticeship Model

- Faculty at universities with large undergraduate populations have difficulty mentoring a significant fraction of undergraduates
- Research opportunities are conserved for students with the most apparent “merit”
- Faculty do not have to widely advertise scarce opportunities, disparately impacting recruitment of underrepresented students with limited social capital
- Underrepresented students are less likely to seek research experiences in later years if they lacked transformative experiences when career decisions are typically made in the first two years
- Faculty filter applicants by establishing easily quantifiable criteria such as completion of advanced coursework, availability, and initial GPA
- Use of poor metrics of research potential have disparate impact on selection of students that have had insufficient preparation in high school, difficulty securing accommodations for disabilities, or need to work to pay for college
- Criteria such as GPA and intention to pursue graduate study are perverse criteria because both increase significantly with research experiences
- Inability to make informed selections can exacerbate implicit bias, especially in the absence of a track record of success
- When working in isolation, students lacking specific knowledge or skills require remediation, which then diminishes retention in the lab in subsequent semesters

Disparate impacts on recruitment, selection, and retention are not manifestations of an unmet need to remediate deficits, but an unmet need for a research education model that removes barriers to participation

## Research-Intensive Community Model

The Research-Intensive Community model [1] is based on asset models and leadership. Instead of 1-on-1 research apprenticeship, research is performed by a diverse undergraduate research team led by a graduate student or postdoctoral scholar preparing for the next stage of a research career. Research teams are productive because they further the team leader’s research by leveraging each undergraduate’s unique assets (talents, skills, perspectives, and experiences). Designed to remove institutional, economic, and cultural barriers to participation of underrepresented students, this model “targets within universalism” to achieve equity. First, research teams incur minimal risk to productivity if a potential recruit lacks a particular skill. With “legitimate peripheral participation”, neophytes without a track record can exhibit a growth trajectory. Over the course of multiple semesters, experienced team members become peer mentors to new team members. Team leaders meet in periodically to explore common interests in research leadership.

## Approach

### Programmatic Implementations of the RIC



Depth: Disciplinary course-based research with collaborative research projects persisting freshman-senior years



Breadth: University-wide graduate professional training that creates undergraduate research opportunities

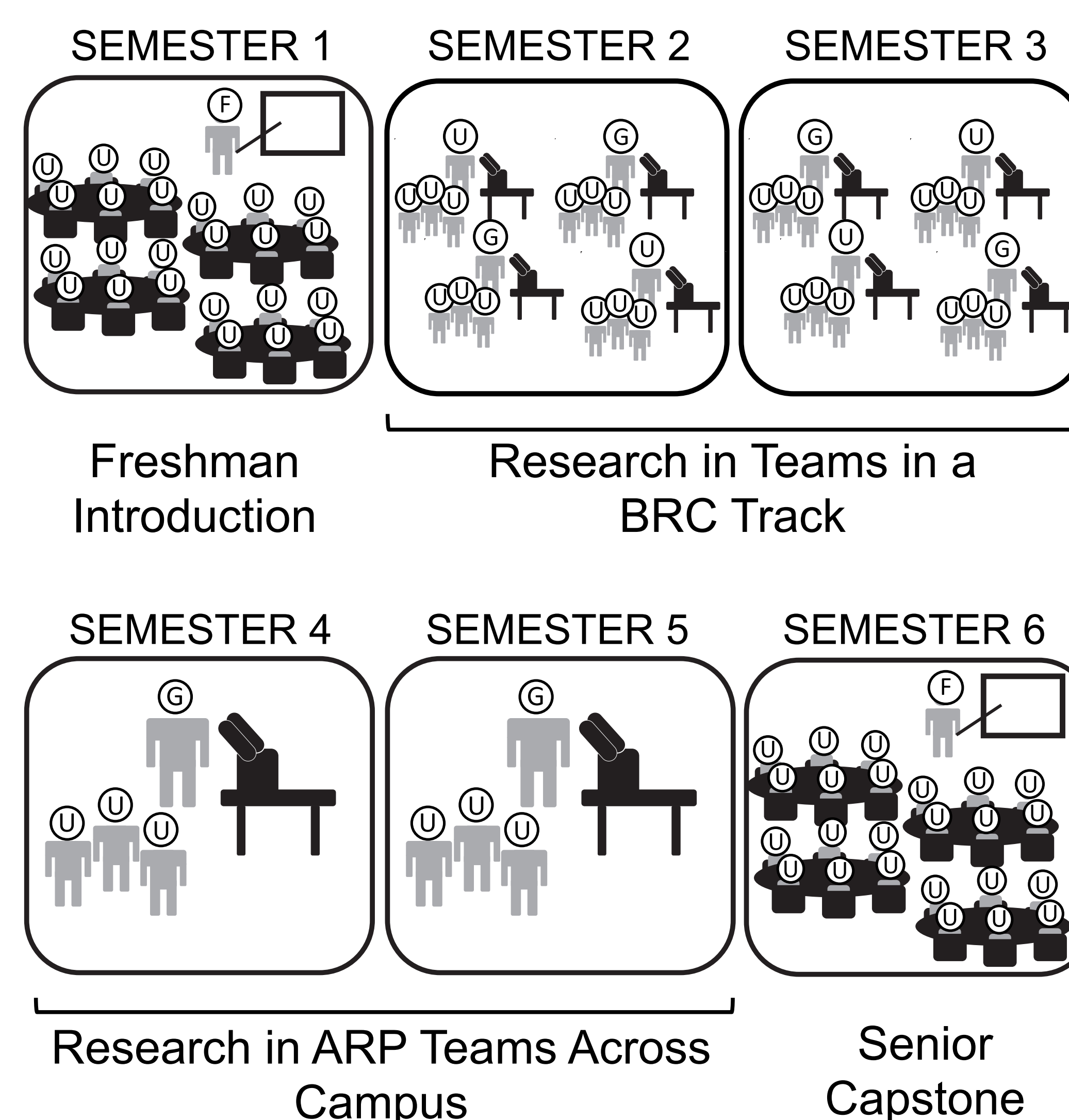
### Aggie Research Program

The Aggie Research Program (ARP) has implemented the RIC model to cultivate mutually beneficial relationships to meet the diverse needs of diverse stakeholders. As the ARP has grown, team leader meetings have become a nexus for specific research leadership programs that are either interdisciplinary or focused on specific life science disciplines, and a point of intervention for best mentoring practices.



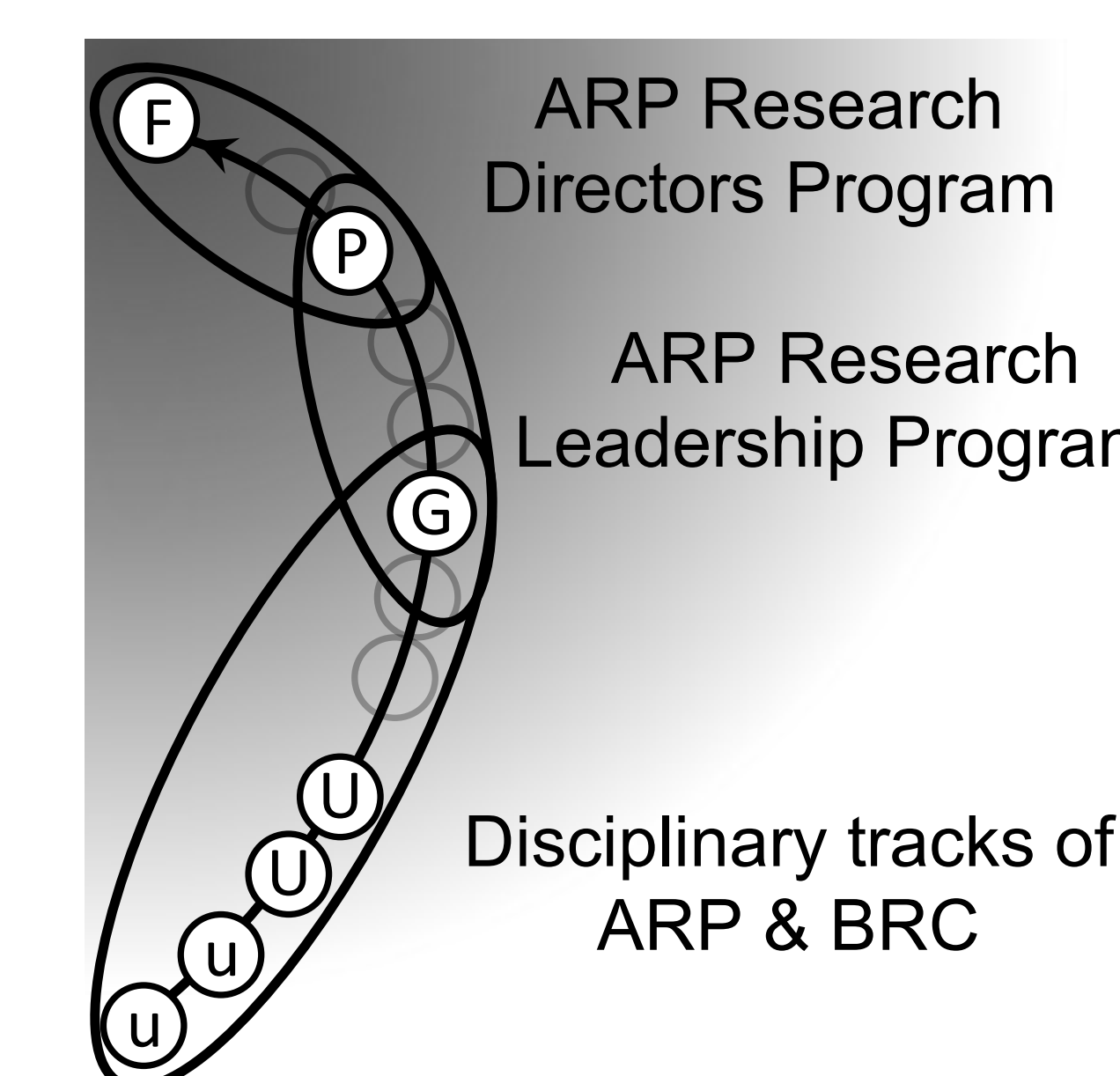
### Biomedical Research Certificate

The Biomedical Research Certificate (BRC) Program implemented the RIC mode through vertically-integrated course-based undergraduate research experiences (CUREs). The BRC is a multi-college program that allows undergraduates to perform research in collaborative teams from the students’ freshman to senior years. Freshmen explore multiple research disciplines and join a particular research track in their sophomore year. These tracks not only engage undergraduates in authentic research projects, but also provide the critical skills needed to take full advantage of opportunities across TAMU in junior and senior years, primarily in the ARP.



## Impact

### Structuring Programs that Permeabilize Boundaries

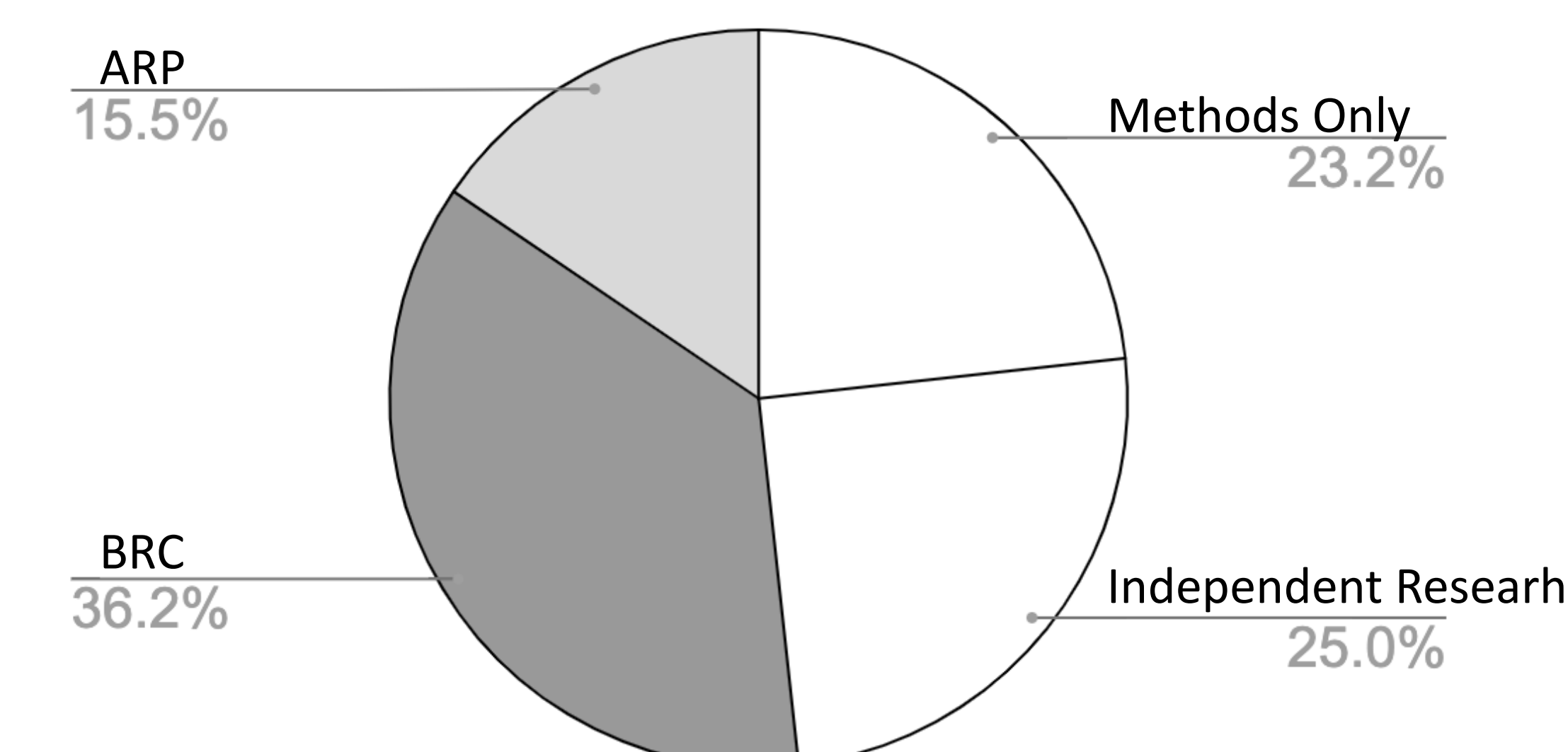


- Open to all students regardless of GPA without prerequisites
- Creates research opportunities for freshmen and sophomores
- Integrates into degree plan to decrease economic barriers
- Structures peer mentorship and networking
- Develops a diversity-minded environment
- Provides opportunities to create positive micro-climates
- Minimizes faculty mentoring load

### ARP and BRC Creates Opportunities

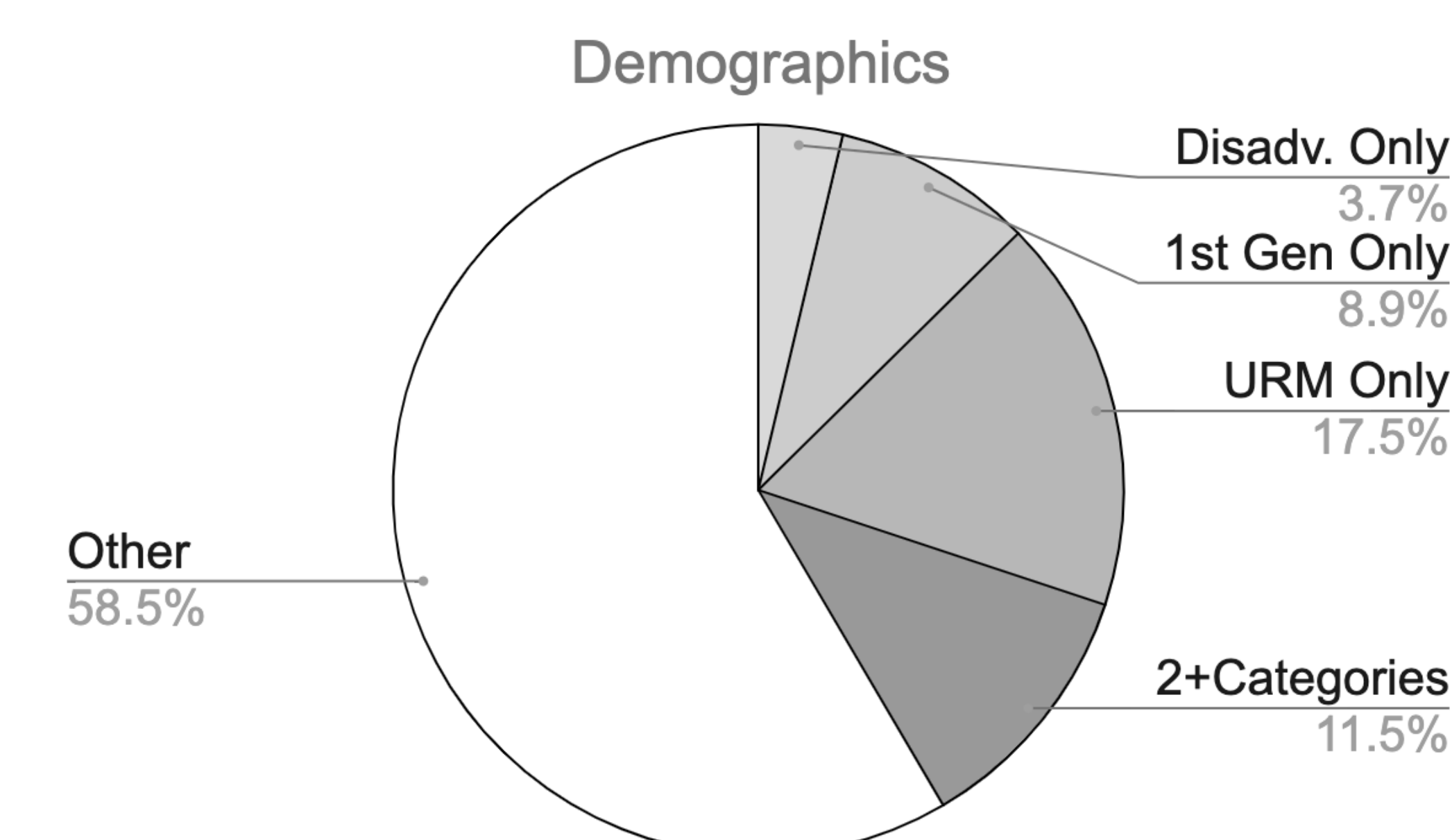
These two programs create the majority of research opportunities for undergraduates at Texas A&M University. Other credit-bearing courses are methods only (without research projects) or “Independent Research” with faculty.

Lower Division Research Courses at Texas A&M 2020



### ARP and BRC Creates Equity

41% of participants in the ARP and BRC are in at least one underrepresented group (financially disadvantaged, 1<sup>st</sup> generation in college, underrepresented racial and ethnic minorities). Demographics of participants precisely reflect demographics of undergraduates enrolled at Texas A&M University.



REFERENCE: [1] Desai KV, Gatson SN, Stiles T, Laine GA, Stewart RH, Quick CM. Integrating Research and Education at Research-Intensive Universities with Research-Intensive Communities. *Adv Physiol Ed*, 32: 136-141, 2008.

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