

**Action for Justice, Equity and Diversity (AJED) Committee
Department of Biology
Duke University**

**Spring semester 2021 report
May 31, 2021**

Members:

François Lutzoni (chair of AJED), Professor
Danae Diaz, graduate student
Jill Chaskes-Foster, staff
Amanda DelVecchia, postdoctoral researcher
Shannon Fang, undergraduate student
Alison Hill, Senior Lecturer
Richard Hilleary, postdoctoral researcher
Clarice Hu, undergraduate student
Paul Magwene, Associate Professor
Jason Dinh, graduate student
Steve Nowicki, Professor
Justin Wright, Associate Professor
Marie Claire Chelini (ex officio - Postdoctoral fellow/communications specialist)
Emily Bernhardt (ex officio - Professor and chair of the Department of Biology)

For each semester of the academic year, the AJED committee submits a report to the Department of Biology. Therefore, this is our second report for the 2020-2021 academic year. If you would like to see the Fall 2020 AJED report (also labeled "2020 Annual Report") go to: <https://biology.duke.edu/about-us/diversity-initiatives/action-justice-equity-and-diversity-ajed-committee/ajed-2020-annual>.

A – Meetings and AJED activities. During the spring semester 2021 the AJED committee met four times (February 1, March 1, April 5, and May 3, 2021) in addition to multiple subcommittee meetings throughout the semester and meetings with other committees. Also, the AJED committee organized eight DEI activities (discussions, informational town hall meetings, and training sessions) throughout the spring semester (listed below in chronological order):

- (1) ***Undergraduate Biology Students Town Hall meeting*** led by Clarice Hu on Feb. 16, 2021.
- (2) ***AJED Town Hall meeting on Feb. 17, 2021.*** The main goal of this meeting, which was open to all members of the department, was to get feedback on the annual report (2020) from the AJED committee and suggestions for new actions to be taken by AJED during the spring semester (2021). The discussion revolved around the need for better mechanisms to detect lack of compatibility between graduate students and their lab. The goal is to minimize, as much as possible, long delays often associated with students' hesitancy to switch lab. The DGS and Steering Committee are aware of

these challenges and discussed various mechanisms that could be implemented starting this upcoming fall semester (2021).

- (3) **Town Hall meeting with Duke Police, Feb. 24, 2021.** A Town Hall Zoom meeting with Daryl Mount (Community Outreach Officer for Duke Police) was organized by the AJED committee in close collaboration with Randy Smith. This meeting was open to all members of the Department of Biology. One goal of this meeting was to propose a set of recommendations to the Steering Committee of this department about the appropriateness, and potential consequences, of calling Duke Police for minor non-violent offenses. A pre-meeting survey was provided to members of the Department of Biology to help the AJED committee and Daryl Mount to get an idea of the issues that are likely to be brought up during the town hall meeting. As a result of this meeting, the AJED committee proposed to the Steering Committee to post on the departmental website:
 - The phone number to call for police intervention when on campus, which is 919 684-2444.
 - The Duke LiveSafe mobile app is highly recommended: <https://prepare.duke.edu/programs/livesafe> .
- (4) **Mentoring workshop** organized by Nadeesha Perera for AJED featuring Dr. Rebecca Barnes – *Discussion of Women and Mentoring: Necessity, Burdens, Biases* – March 29, 2021. Dr. Barnes's workshop description: "Many academics, regardless of rank, often state that their career advancement was due in part to effective mentoring and the role of mentors in their professional development. While some aspects of mentoring are still best served by formal mentoring relationships (i.e., a PhD committee advising the direction of a student's research), a mentoring paradigm that empowers the mentee to actively expand his or her network and find the support needed—from different individuals, in different contexts, over different time spans—utilizing both informal and formal mentoring approaches, is usually the best approach to meet individual needs. We will discuss the different types of support we all need and how to build your own mentoring network; thereby increasing personal and professional resilience."
- (5) **Broadening undergraduate advising at Duke** by including more tenure-track faculty from the Department of Biology as college advisors for undergraduate students before they declare their major. An introductory session on college advising was led by David Rabiner (Director of the Academic Advising Center) on April 2, 2021. This was a recruiting effort with the ultimate goal to have more biology faculty involved with college advising during a period of time (first four semesters) when students are most vulnerable, especially underrepresented students from underserved communities.
- (6 & 7) **Two training sessions on intercultural competence** were organized by Steve Nowicki as part of the Biology seminar series. These were led by Esra Uzun Mason, Associate Director of Duke's International House, and held on April 5 and 19. Titled "Leading with an Intercultural Awareness", the two sessions discussed what intercultural awareness means, how culture impacts our meaning making, and how intercultural learning is connected to social justice practices.
- (8) **Hollaback Bystander Intervention workshop**, May 11, 2021. Description of the workshop from the organizers: "**Workshop Description:** We all have a responsibility

to do something when we see disrespect or harassment happening, but too often we freeze. We don't know what to do. At Hollaback! our goal is to reduce instances of disrespect and harassment by giving people the tools they need to disrupt those perpetrating it. We will equip you to be an effective bystander in the midst of disrespect or harassment by using our proven 5Ds of bystander intervention methodology - distract, delegate, document, delay, and direct. 98% leave our training committed to intervene next time they witness disrespect or harassment."

B – Official diversity-Inclusion (DI) statement for the Department of Biology and for syllabi, including Land Acknowledgement:

It seems that most members of this committee were in favor of adopting the A&S DI statement with potential modifications, or for writing a new, more personal, DI statement for our department. Also, there seems to be a consensus to include a Land Acknowledgement statement as part of our DI statement webpage. There is a university-wide Land Acknowledgement committee working on an official Duke University Land Acknowledgement (LA). Until this official LA is available, we should include links to the Duke Forest and CMA Land Acknowledgment included below. The DI statement for the department and for syllabi don't need to be the same. AJED recommends that faculty take the time to prepare their own DEI statement instead of copying and pasting in their syllabi existing statements. Information to guide instructors will be provided this summer. We agree that a link for the navigating tool(s) to existing resources at Duke for harassment, discrimination and abuse should also be part of the departmental and syllabi DI statements. The first version of this navigating tool is now available through the Graduate School with a link on the new website for the Department of Biology. This is already partially implemented: <https://biology.duke.edu/about-us/diversity-initiatives>

The AJED committee proposed that syllabi include something related to this suggestion from the IDEA website: "explicitly invite students to let you know if there are any circumstances shaping their learning experience of which you need to be aware."

It was also proposed that the AJED committee will collect a few syllabi statements that can be shared via hyperlinks on the "Diversity Statement for Syllabi" page as examples to inspire instructors.

Duke Forest Land acknowledgement (NSOE) and from the Center for multicultural affairs. These are already available and could be used for syllabi.

<https://dukeforest.duke.edu/files/2020/11/Duke-Forest-Land-Acknowledgement.pdf>
<https://studentaffairs.duke.edu/cma/about-us/land-acknowledgement>

* However, it is important to realize that some Native Americans on the Land Acknowledgement committee at Duke would prefer if instructors wait until the official Land Acknowledgement is available before posting other Land Acknowledgements that are already circulating at Duke.

C – Graduate students can now refer to [this interactive tool](#) offered by the Graduate School to report harassment, discrimination, and other concerns:

<https://projects.gradschool.duke.edu/reporting/>

This link can also be accessed through the Department of Biology website:

<https://biology.duke.edu/about-us/diversity-initiatives>

D – Additional mechanism to report harassment, discrimination and other concerns for all members of the Duke community. There is an ongoing effort (led by Emily Bernhardt for the adoption by the Department of Biology (and other units at Duke) of the Peer Messenger (cup of coffee) program from the School of Medicine Professional Accountability Program, and foreseen role of AJED. Please see this video, if you are not familiar with this program: <https://www.youtube.com/watch?v=4hCuMOSmUZs>

E – Recruitment of two undergraduate student representatives by the AJED committee for the 2021-2022 academic year: Amber Brooks and Dakota Douglas have accepted the invitation to represent undergraduate students on the AJED committee starting August 2021. The recruitment effort was led by AJED members Clarice Hu and Shannon Fang (2021 graduates). There was so much interest for these two open positions by Biology undergraduate students, that they are likely to establish their own DEI committee, in addition to the IDEA graduate student led committee, and the department-wide AJED committee.

F – AJED, Outreach Subcommittee Spring Semester Report:

Members of this subcommittee have been working to participate in the Darwin Day Roadshow. Also, Marie Claire Chelini and Danae Diaz met with teachers from the North Carolina School of Science and Mathematics (NCSSM) to learn what the community would benefit from and are going to get together to plan how to execute it. Based on these conversations, Marie Claire Chelini coordinated with videographer Véronique Koch, from UComms, Kristin Dimac-Stohl and Jorge Fidhel Gonzalez to produce a video tour of the greenhouse, to be released in June 2021. We are especially thankful to Kristin and Jorge for helping us produce this outreach material, which will be made available to local High Schools and will hopefully encourage in-person visits to the greenhouse once Covid restrictions are lifted.

G – AJED, Governance Subcommittee Spring Semester Report:

Our primary focus this past semester has been on implementing the inclusion of Diversity, Equity and Inclusion activities into faculty annual reporting and providing resources to faculty to assist them in developing this area of their portfolio going forward. This proposal has been approved by the Biology Steering Committee and will be implemented for the 2021 annual review cycle. We have also compiled a list of DEI activities provided by the faculty in their 2020 annual review documents (see below) and will be provided to all faculty. The next steps are for the Governance sub-committee members to work with the departmental Performance Review Committee to develop a

rubric or other set of standards for assessing faculty members' overall DEI activities. As stated in the approved proposal, those faculty with notably high performance in this area will receive a bonus to their overall performance score.

Summary of Faculty DEI Activities during 2020:

Workshops and Training Activities

Duke Biology faculty report participation in a wide range of workshops, training activities, and discussion groups related to diversity, equity, inclusion, and anti-racism (DEI&A) topics. These include:

- Teaching and Leading for Equity workshop
- Culturally inclusive pedagogy and communications workshops
- Implicit bias training, various mechanisms (e.g. GAC, IDEALS office in SOM)
- FAS workshop on leadership in a challenging environment
- Picture a Scientist Film and discussion
- UndocuAlly training
- IDEA committee summer reading discussion (2020: Angela Saini, "Inferior")

Teaching

Many faculty indicate that they have updated their course materials to highlight the contributions of women and minority scientists, or to include discussion of the impact of race, gender, and other sources of explicit and implicit bias in the history of biological ideas.

A noteworthy interdisciplinary effort along these lines is the The "Unearthing Duke Forest" project (<https://fhi.duke.edu/opportunities/call-participation-unearthing-duke-forest-working-group>) whose "goal is to uncover the ecological and social history of Duke Forest, and to give voice to the former inhabitants of the forest through historical, social-science, and ecological research" (quoting from Kathleen Donohue). A model like this might be applied to other sub-disciplines represented in our department.

Advising and mentoring

College advisors can request the Academic Advising Center (AAC) to advise first generation and/or BIPOC students, or students with disabilities, for example. This is a powerful way to interact with first-year and sophomore undergraduate students and help them to succeed at Duke at a time when they are most vulnerable. This also opens the possibility for a faculty to continue advising their advisees if they declare Biology as their primary major. <https://advising.duke.edu/>

Volunteer to be a faculty advisor for a student led organization at the Duke Center for Multicultural Affairs (CMA), such as the Asian Student Association, Mi Gente (Latinx student organization), Students of the Caribbean Association (SOCA), and Native American Student Alliance (NASA). <https://studentaffairs.duke.edu/cma/student-support/advising>

Initiatives to provide unbiased and fair advising to a diverse graduate student body and postdoctoral research community.

Research

With respect to research, faculty reported DEI&A activities included:

- Graduate and postdoc recruiting efforts -- this includes a variety of activities such as recruiting at disciplinary conferences, or more focused participation in meetings such as ABRCMS and SACNAS; impact somewhat curtailed by online format in 2020 due to pandemic
- Effort to facilitate and promote inclusive undergraduate research -- Duke has many such efforts on campus, including efforts aimed at both Duke and non-Duke students. These include programs such as the Huang Fellows Program, BSURF, Regeneration Next Summer Fellows, etc. Biology faculty report participation in a cross section of these programs. The IDEALS office in the School of Medicine maintains a useful list of summer undergraduate research programs at <https://medschool.duke.edu/about-us/diversity-and-inclusion/ideals-office/duke-stem-summer-research-opportunities>.
- Interactions with local minority serving institutions -- several faculty have ongoing collaborative research and training efforts with colleagues at minority serving institutions such as NCCU and NC A&T.

Departmental, Campus, and Scientific Community

Biology faculty highlighted efforts to create inclusive departmental, campus, and scientific communities through activities such as:

- Making sure research groups themselves are diverse
- Encouraging open discussion of topics such as violence against BIPOC and immigrant communities in lab meetings
- Promoting diversity and equity within the scientific societies they are involved in

Barriers

The three major barriers faculty identified for promoting inclusive diversity were:

- Time
- Financial resources -- particularly as it relates to faculty hires
- COVID -- the pandemic negatively impacted many of the in person outreach and recruiting efforts that Biology faculty often participate in

Final version of the Action for Justice, Equity and Diversity (AJED) committee proposal to integrate Diversity, Equity, and Inclusivity (DEI) activities in the faculty Annual Performance Review process. This proposal was approved by the Department of Biology Steering Committee on April 26, 2021:

(1) List of activities that were recognized as DEI activities in previous years will be provided to faculty as soon as possible the following year to inspire and provide enough time before faculty submit their annual performance reports.

- (2) DEI activities will be considered as a fourth category, in addition to Research, Teaching, and Service.
- (3) Faculty will report their activities as usual in the Research, Teaching, and Service categories but would flag, or highlight, the activities that should also count as DEI activities. This way, faculty will not have to enter these activities twice in their annual performance reports.
- (4) The Performance Review Committee (PRC) will consider DEI as a separate category and give a score independently from the other three categories using the same scale as used for Research, Teaching and Service. Training, workshops, and self-improvement will be considered but the goal is the application of the concepts (action) in each one of these three categories.
- (5) This fourth category would count as up to an additional 10% to the usual three categories, based on the PRC's score in the DEI category and/or could count towards a faculty award/recognition for exceptional DEI accomplishments.

Rationale: We felt that keeping DEI work as a 4th category was important to highlight its overall importance to maintaining excellence in Biology. Additionally, there were concerns that having it be a component of the existing categories might lead to unintended overweighting of DEI work in research (since this component is worth a greater proportion of the overall assessment) than in teaching or service.

Next step: The AJED governance sub-committee will develop a rubric to help the PRC assess individual faculty work in the DEI sphere once this proposal is approved by the AJED committee and the Steering Committee.

H – AJED, Education Subcommittee Spring Semester Report:

Report submitted by education subcommittee chair Alison Hill on May 25, 2021
May 25, 2021

Education Subcommittee Report – Spring 2021 Subcommittee members:

- Alison Hill (Senior lecturer)
- Jill Foster (Staff)
- Danae Diaz (Graduate student)
- Shannon Fang (Undergraduate student)
- Clarice Hu (Undergraduate student)
- François Lutzoni (Professor)
- Steve Nowicki (Professor)
- Jason Dinh (Graduate Student)

The following questions motivated the work of the 2021 spring semester AJED education subcommittee:

- What would an inclusive biology curriculum look like?

- What is the evidence that either supports or refutes that our current curriculum is inclusive or not?
- If the current curriculum is not inclusive, what do we need to change about our gateway structure to give an equal opportunity to all incoming students?
- What is the best way for our committee to learn about undergraduate perceptions of the inclusiveness of the biology curriculum?

The report describes the completion of three action items by the Spring 2021 AJED education sub-committee. The **first action item** was a set of recommendations that our subcommittee made to the department's steering committee. The **second action item** consists of a series of interviews with undergraduates conducted by our committee members Shannon Fang and Clarice Hu regarding student experiences in our molecular biology gateway course (Bio201L). The **third action item** is an analysis, conducted by the Office of Assessment, of potential demographic biases in the perceived learning value of Bio201L based on student responses to an end-of-semester internal survey.

Action Item 1: In the spring semester, our committee developed a list of recommendations to put forward to the Biology Department steering committee. One of our recommendations was that our department undertake a comprehensive evaluation of the introductory gateway curriculum (see recommendation to the steering committee pasted below). We are pleased that the department leadership decided to engage the NSF PULSE program to evaluate the undergrad curriculum. Part of the PULSE evaluation will be evaluating whether our courses are perceived as inclusive and equally accessible to all students and whether the implementation of our curriculum is in accordance with the recommendations of Vision and Change (<https://visionandchange.org>).

Recommendation to the steering committee:

We recommend, as a department, we undertake a thorough (potentially year-long) “rethink” of the introductory gateway curriculum. We are in the 10th year of teaching the gateway curriculum and our department could benefit from a “Blue Sky” conversation potentially unfolding over a year's time. We, on the subcommittee, are happy to participate or help arrange this discussion. Some of questions that we would like prioritized in this review are:

- How well does our curriculum address the needs of students entering our courses without the benefit of strong high school preparation in biology? Can we do this better? Can we make this a priority of the introductory curriculum?
- Does the design of our gateway courses (e.g. Bio201L, Bio202L and Bio203L) reflect best practices in pedagogy previously shown by us, and others, to reduce achievement gaps between majority and minority students in introductory STEM curriculums?
- How well does the current content of our introductory curriculum address the full span of topics of contemporary interest across the broad discipline of biology? For example,

ecology is not a part of our current introductory curriculum, but essential for understanding climate change.

- Do we sufficiently challenge our students to develop higher level problem-solving skills in our courses and to move away from the perspective that biology is a collection of facts to be memorized?
- Do we have mechanisms to encourage self-reflection by our faculty to develop awareness of their biases and assumptions toward their students?
- Do we have mechanisms in place for holding faculty accountable for student-reported microaggressions that are inconsistent with our department's diversity and inclusion statement?

Action Item 2): Shannon Fang and Clarice Hu (both graduating seniors in Biology) conducted a series of one-on-one interviews with 12 undergraduates who had previously taken the molecular biology gateway (Bio201L). The culmination of this series of interviews is a written report by Clarice and Shannon including: student responses to the questions listed below, student suggestions and Shannon and Clarice's personal reflections on the interviews. Included in this report are excerpts from both Clarice and Shannon's personal reflections and Emily Bernhardt's summary comments. Note, this project was supported by funds from the David L. Paletz Innovative Course Enhancements grant awarded to Alison Hill in 2019.

INTERVIEW QUESTIONS:

Intro

Statement of anonymity

What year are you? What is your major?

People often have multiple important identities in their lives. Can you tell me the identities you have that are important to you? These could be identities that describe who you are, or things that describe different roles you have.

Are there any other identities you have that you feel impact your experience at Duke?

What was your background in biology before coming to Duke?

Questions

- Do you feel like people who share your identity were welcome in the Bio201 class environment? Why or why not?
- How rigorous (or not) was Bio201 for you?
- What aspects of any of your biology classes made you feel supported/included?
- How did the introductory biology courses influence your academic interests or path?
- Have you felt properly supported or prepared in finding biology opportunities to be competitive in the field (e.g. research, etc.)? Why or why not?

Suggestions/comments/questions

- Do you have any suggestions for how to improve introductory biology? Is there anything you would change about the courses?

- What do you wish the professors and TAs in these classes knew about you going into the class?

Clarice Hu reflections:

....We recruited students through professor recommendations. Though this has problems (namely these students have thus likely been relatively engaged in the class), it also increased the likelihood for their participation. Most of the students that we reached out to responded and agreed to be interviewed. These factors related to recruitment/interviewing may be important to consider when going forward with further research/surveying.

As for what students shared:

1. One thing I think should be emphasized more going forward is increased community-building across all parties. Students shared how they enjoyed interacting with professors--through sitting in the front of the room or in office hours. They also expressed appreciation for 201 Lab TA's being super stars and really putting in effort to support, propel, and listen to students. Lastly, students spoke to the importance of having the support of their peers. I think the idea presented by one interviewee- creating study groups for those who need them- is a valuable and good one.
2. Representation is important. Many students, including myself, have not had many professors that share their identities. It doesn't actively bother most people, but when prompted to consider this, students did express frustration and sadness.
3. For Bio 201/203, students either: a) did not find material difficult, but the amount of work was difficult or b) found both to be difficult. Fewer students brought up 202, but similar sentiments.

Questions to consider:

1. What is the purpose of making the course so work-heavy?
 2. Does it have to be so large?
 3. What is the purpose of not offering something like Bio 101, or Bio 99?
 4. How can we increase faculty-student engagement in the department?
- In the end, I think most students appreciated the opportunity to be heard, and I also was impressed and flattered by their candor in sharing.

Shannon Fang reflections:

(1) I think the greatest challenge related to equity and inclusivity is the sheer size and diversity of the BIO201 class. Every student has a different experience of the course because the personalities, backgrounds, interests, and study habits of students are all different. Because there is no BIO101, you must proactively provide a variety of resources that can cater to a variety of individuals in order to ensure all students feel they can be successful. The BIO201 TAs are amazing—utilize them, have them reach out to students, let them gather student feedback. These resources include the current ones being offered, as well as the suggestions listed above (particularly the ones in green). Despite knowing nothing going into CS101 and PSYCH 101, and knowing my peers were more advanced than I was, I still felt I could be successful. This is not always the case in BIO201.

(2) Students feel confident and motivated when they believe they can do well and feel that their professors and TAs care about their success. Validating students and making them feel heard by being accessible, responsive, and understanding to questions/concerns/accommodations was a common theme. In the interviews, many students were grateful to have someone listen to their experiences.

(3) Guiding question for the future: What are the goals and outcomes of the introductory curriculum, and what are their relative levels of importance? Is it providing a foundation to prepare for future biology courses? Is it to introduce students to the entire field of biology? Is it to make them excited to and persuade them to join the biology major? Often but not necessarily, more content = more difficult = more academic stratification. Defining priority outcomes will help decide the amount of content and type of content in introductory biology.

Emily Bernhardt summary comments:

I'm very, very struck by three emergent themes: the feelings of not 'belonging'; the need for peer support to change those feelings; and how much it matters when faculty and TAs make it clear they both have and encourage their students to adopt a growth mindset.

In conclusion, the AJED committee is very appreciative of the terrific job that Shannon and Clarice did on the project. Jill Foster summed it up nicely: “Thanks so much to Shannon & Clarice for the time, effort, and care they've put into this project. I know the insights they have gathered will be really valuable moving forward, and we all appreciate this important work”.

Action Item 3): Alessandra Dinin from the Office of Assessment analyzed our student responses to the Bio201L end of semester survey from multiple semesters. This analysis set out to determine whether there is a demographic bias to how students responded to four Likert scale questions. On these survey items, a score of 1 indicated that students strongly disagreed, while a 5-score meant they strongly agreed (a higher score is positive for Bio 201)

The four Likert scale questions of interest for this analysis were:

- 1) I feel that my semester overall in Bio 201L was a valuable learning experience.
- 2) My experience in Bio 201L this semester increased my overall interest in biology.
- 3) The form of assessment in Bio 201L (i.e. quiz and exam questions) motivated me to think more deeply about molecular biology.
- 4) The practice quiz and exam questions promoted higher level thinking and application in molecular biology.

The analysis from the Office of Assessment showed:

- Students generally found their learning experience in Bio201L was valuable.

- Quiz scores were the highest indicators of how a student will rate their experiences in the class (based on answers to the 4 survey questions): **those students that scored high (above 80%) on the quizzes rated questions 1-3 significantly higher than those that scored lower on the quizzes ($P_{r>|t|}$ was ≤ 0.0001).**
- **Question 4 which focused on the value of the practice quizzes/exam questions for promoting higher level thinking and application was ranked higher by students that did less well on quizzes ($P_{r>|t|}$ was ≤ 0.0001)**
 - Not statistically significant in correlation for any 4 questions were the following comparisons:
 - Previous standardized assessments that could indicate STEM ability
 - Previous indicated interest in Natural Sciences from the pre-matriculation advising survey
 - Previous indicated interest in Biology from the pre-matriculation advising survey
 - **Question 1-2 for racial identity and 1-3 for gender were also statistically insignificant**

This particular action item, or analysis, was originally motivated by the hypothesis that we would see a demographic bias associated with answers to questions 1-2. This analysis suggests that the only demonstrated bias to the perceived learning value (questions 1-2) is how well students performed on the six quizzes during the semester.

Alessandra Dinin has generously agreed to continue analyzing the Bio201L course data to determine whether AP scores on biology or math are predictive of grade outcomes. The outcome of this analysis should help to inform the department's decision to create a Bio101 (pre-gateway course).

In conclusion, the various course assessments pursued by the AJED education subcommittee over the spring semester contribute to our understanding of how the introductory gateway curriculum is perceived by our students and suggests action items the department can take moving forward in our efforts to create a curriculum that is an inclusive experience for all incoming students regardless of their high school preparation.