Analysis of the 2020 and 2021 RMBL Diversity Survey and Diversity Benchmarks

Ian Breckheimer
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Abstract

This is an analysis of the 2020 and 2021 responses to the Diversity Survey administered to the RMBL community in November 2020 and November 2021 along with a comparison of the demographic characteristics of the community with national benchmarks. Survey responses were anonymous, and were solicited with messages to the RMBL email distribution list. The survey attracted 113 responses in 2020 and 70 responses in 2021. The survey had 121 response items and collected detailed data on the demographics, experiences, and attitudes of members of the RMBL community. In this report, I describe the major patterns present in the survey responses, with a particular focus on responses expressing negative sentiment or experiences. This emphasis is largely due to the distribution of sentiment in the responses, with a strong majority of respondents reporting largely positive experiences, but a significant fraction of respondents expressing mixed or largely negative experiences (see Figure 2). In subsequent sections, I compare the distribution of negative experiences by different segments of the RMBL community, focusing on categories of race / ethnicity, sexual orientation, gender identity, the educational attainment of parents, perceived family income, and role within the RMBL community. To diagnose which common experiences and sentiments are driving negative responses, I summarize the most common responses expressing negative sentiment across the entire respondent community and in several subgroups. Finally, I compare demographic characteristics of the RMBL community to national benchmarks for undergraduates, graduate students, postdocs, and faculty. Major findings of my analysis are these:

• Survey respondents are overwhelmingly non-hispanic white (77%), heterosexual (70%), and cis-gendered (85%). They come from families where parents are college educated (77%), and that have average or above-average income (72%).

• A wide variety of roles within the RMBL community are represented in the survey, with the greatest percentage of responses from Graduate Student (24%), and non-Graduate PI (24%) components of the community.

• The respondent pool in 2021 reflected greater representation of gender minorities, but less representation of most other demographic groups than the 2020 survey.

• The survey respondents were broadly demographically similar to the RMBL community at large (as judged by comparing respondents’ demographic profile to that of scientists and students registered on the RMBL Portal in 2021) with a few key differences. Younger people, racial / ethnic minorities, and men were were slightly underrepresented in the survey compared to the community at large (by 5-8%, 20%, and 9%, respectively).

• A large majority of respondents to the survey described largely positive experiences at RMBL, with 71% of respondents expressing positive sentiment on 90% or greater of the 40 potential items that could be coded according to sentiment.

• Cis-gendered women, non-white respondents, and sexual orientation and gender minorities expressed negative sentiment and experiences at higher rates than respondents not in those categories in both 2020 and 2021.
• Respondents with lower levels of parental education and from families with lower than average perceived income expressed negative sentiment and experiences at higher rates than respondents not in those categories. These patterns were consistent in 2020 and 2021 except for family income, where low-income respondents expressed more negative responses in 2021 than 2020.

• Differences in negative sentiment and experiences between demographic groups persisted after accounting for respondent age (a potential confounder) using multiple linear regression.

• The top 3 reported experiences that made respondents Uncomfortable or Very Uncomfortable were informal social activities, spending time in the Crested Butte community, and attending RMBL-organized social activities. This was true for respondents overall, and also for those in at least one uncommon demographic group and those expressing a large number of negative responses. In contrast, a very small proportion of respondents were uncomfortable performing research activities or working with their supervisor / advisor.

• The three most common positive statements that respondents disagreed with were “Obtaining funding for my research was not a problem”, “I feel like people like me were represented at RMBL”, and “I was aware of the proper channels for reporting harassment of any nature”.

• More than 20% of respondents expressed that they had experienced or witnessed sexist remarks, inappropriate jokes, and microaggressions. A smaller proportion of respondents (less than 10%) reported discrimination based on their race, gender, disability, or LGBTQ status.

• Demographic “outsiders” (respondents in at least one uncommon demographic category) reported greater rates of discrimination in 2021 compared to 2020 across several categories of discrimination, but the changing respondent pool makes this result difficult to interpret.

• Community members with Black or African American identities are underepresented in the RMBL undergraduate community (3.7%) compared to all US undergrads enrolled in 2-year or 4-year degree programs (13.7%), and are completely absent from postdoc and professor roles. In 2021 there were zero Black or African American postdocs or assistant, associate, or full professors at RMBL. This group accounts for 14.5% of US adults age 45 - 64, and makes up 6.2% of US full-time university faculty and 5.3% of US Ecology and Evolution professors.

• Community members with Hispanic or Latino ethnicity are underepresented in RMBL undergraduate, graduate student, and professor segments of the RMBL community compared to national benchmarks. This group accounts for 13.7% of RMBL Undergraduates (compared to 22% in national benchmarks), just 3% of graduate students (compared to 11.5 to 20% in national benchmarks), and 1.8% of professors (compared to 5.3 to 13.8% in benchmarks).

• Community members who list Native American or Alaska Native as their only racial identification were absent from the RMBL Undergraduate, Postdoc, and Professor communities. Differences in how multiple racial identifications are handled between the RMBL Portal and national surveys prevent comparing community members with more than one racial identification.

• Women are substantially underrepresented in professor roles at RMBL. Women account for 39.7% of RMBL professors, compared to 47.5 to 51.2% in national benchmarks. In contrast, women are substantially overrepresented in Undergraduate and Graduate Student roles. Women are better-represented among PIs with registered research plans (50%).

• Asian community members are also underrepresented in professor roles in the RMBL community (1.8%) compared to national benchmarks (5.3 to 11.9%).
What is the demographic makeup of the survey respondents?

Figure 1: Overall makeup of survey respondents by reported Race / Ethnicity, Sexual Orientation, and Gender Identity. Categories with less than 4 respondents have been aggregated to protect the anonymity of participants. Race / Ethnicity responses included in the “Other Race / Ethnicity” group include “Hispanic / Latinx”, “Asian”, “American Indian or Alaska Native”, “Black for African American”, and “Some other race, ethnicity, or origin”. Responses included in the “Other Orientation” group include “Bisexual”, “Queer”, “Questioning”, “Gay”, “Asexual”, “Lesbian”, and “Pan”. Responses included in the “Other Gender” category include “Nonbinary” responses and those that responded “Yes” to the question “Do you have a transgender identity, history, or status?”.

Figure 2: Overall makeup of survey respondents by reported parents’ level of education, perceived income, and role in the RMBL community. Categories with less than 4 respondents have been aggregated to protect the anonymity of participants. For RMBL role, respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with “Staff” superseding “PI (non-graduate student)” superseding “Graduate Student” superseding “Undergraduate Student” superseding “Research Technician / Research Assistant”. The “Other Role” category includes “Volunteer”, “Board Member” “Postdoc” (excluding those that selected a PI role), and other write-in roles.
How do survey respondents differ from the RMBL community at large?

Figure 3: Survey respondents in 2020 and 2021 were demographically similar to the community at large, with a few key differences. All scientists and students working at RMBL in 2021 were required to register in the RMBL portal, so their registration provides some basic demographic information that can be compared to survey respondents. For Age Class, reported dates of birth in the RMBL portal were converted to age categories matching the categories present on the survey assuming a current date of July 1st, 2021. For Race / Ethnicity, respondents in both the Community Survey and RMBL Portal who identified any non-white racial or ethnic category were placed in the “Other Race / Ethnicity” category. *Gender responses were solicited as an open-ended question in the RMBL portal, with no explicit question about transgender status. This differs from the Community Survey, which asked about both gender identity and transgender status. This means that we can only compare reported gender, placing Portal respondents reporting their non-binary, gender queer, or trans status in the “Other Gender” category.
What is the overall distribution of negative sentiment and experiences among survey respondents?

Figure 4: Overall distribution of negative sentiment responses in the 2020 and 2021 RMBL Community Survey. The x-axis represents the total number of response items in each completed survey that express negative sentiment (e.g. “Uncomfortable / Very Uncomfortable”, or “Disagree / Strongly Disagree” with a positive statement) broken into 6 bins (0-3, 4-7, 8-11, 12-15, 16-19, and 20-24 negative response items, respectively). There are a maximum of 40 such items on the survey that could be coded according to sentiment. The y-axis represents the number of submitted surveys in each sentiment category. The mean number of negative-sentiment items in each category is represented by the dotted vertical blue line. The three categories of questions that were included are those in the section “Reflecting on the following activities that are part of life at RMBL, please indicate your level of comfort doing each on this scale of very uncomfortable to very comfortable”, “Reflecting on your time at RMBL, how much do you agree with the following statements?” and “Which of the following have you experienced or witnessed while at RMBL or in a RMBL-related context? While at RMBL, someone...”.
How does negative sentiment vary across categories of race, sexual orientation, and gender?

Figure 5: Histograms of negative sentiment from the 2021 RMBL community survey by Race / Ethnicity, Sexual Orientation, and Gender Identity. Race / Ethnicity responses included in the “Other Race / Ethnicity” group include “Hispanic / Latinx”, “Asian”, “American Indian or Alaska Native”, “Black for African American”, and “Some other race, ethnicity, or origin”. Responses included in the “Other Orientation” group include “Bisexual”, “Queer”, “Questioning”, “Gay”, “Asexual”, “Lesbian”, and “Pan”. Responses included in the “Other Gender” category include “Nonbinary” responses and those that responded “Yes” to the question “Do you have a transgender identity, history, or status?”. 
Figure 6: 2020 and 2021 distribution of negative sentiment by Race / Ethnicity. Race / Ethnicity responses included in the “Other Race / Ethnicity” group include “Hispanic / Latinx”, “Asian”, “American Indian or Alaska Native”, “Black for African American”, and “Some other race, ethnicity, or origin”.
Figure 7: 2020 and 2021 distribution of negative sentiment by sexual orientation. Responses included in the “Other Orientation” group include “Bisexual”, “Queer”, “Questioning”, “Gay”, “Asexual”, “Lesbian”, and “Pan”.
Figure 8: 2020 and 2021 distribution of negative sentiment by Gender Identity. Responses included in the “Other Gender” category include “Nonbinary” responses and those that responded “Yes” to the question “Do you have a transgender identity, history, or status?”.
How does negative sentiment vary across categories of parents’ education, income, and RMBL Role?

Figure 9: 2020 and 2021 distribution of negative sentiment by parent’s education, perceived family income, and RMBL Role. Education categories grouped in the “Some College” group include those who’s parents completed a Batchelor’s Degree or other professional degree. Income categories are derived from the prompt “Compared with American families in the US in general, would you say that your family income is:”. Income responses of “Above Average” and “Far Above Average” were grouped to form the “Above Average” category, and responses of “Below Average”, and “Far Below Average” were grouped into the “Below Average” category. For RMBL Role, respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with “Staff” superseding “PI (non-graduate student)” superseding “Graduate Student” superseding “Undergraduate Student” superseding “Research Technician / Research Assistant”. The “Other Role” category includes “Volunteer”, “Board Member” “Postdoc” (excluding those that selected a PI role), and other write-in roles.
Figure 10: 2020 and 2021 distribution of negative sentiment by reported Parents’ Education. Education categories grouped in the “Some College” group include those who’s parents completed a Batchelor’s Degree or other professional degree.
Figure 11: 2020 and 2021 distribution of negative sentiment by perceived family income. Income categories are derived from the prompt “Compared with American families in the US in general, would you say that your family income is:”. Income responses of “Above Average” and “Far Above Average” were grouped to form the “Above Average” category, and responses of “Below Average”, and “Far Below Average” were grouped into the “Below Average” category.
Figure 12: 2020 and 2021 distribution of negative sentiment by RMBL Role. Roles were derived from the prompt: “What was your most recent role at the RMBL”. Respondents could select more than one role, and multiple responses were combined using a hierarchy of roles, with “Staff” superseding “PI (non-graduate student)” superseding “Graduate Student” superseding “Undergraduate Student” superseding “Research Technician / Research Assistant”. The “Other Role” category includes “Volunteer”, “Board Member” “Postdoc” (excluding those that selected a PI role), and other write-in roles.
What are the most common negative experiences and sentiments expressed in the RMBL community survey?

Figure 13: Proportion of “Uncomfortable / Very Uncomfortable” responses across activities listed under the prompt “Reflecting on the following activities that are part of life at RMBL, please indicate your level of comfort doing each on this scale of very uncomfortable to very comfortable.” Responses are ranked according the average proportion of “Uncomfortable / Very Uncomfortable” ratings in 2020 and 2021 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from “Outsiders”, respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. “Uncomfortable / Very Uncomfortable”, “Disagree / Strongly Disagree” with a positive statement). This category accounts for 29.0% of respondents.
Figure 14: Proportion of “Disagree / Strongly Disagree” responses across activities listed under the prompt “Reflecting on your time at RMBL, how much do you agree with the following statements?” Responses are ranked according the average proportion of “Disagree / Strongly Disagree” ratings in 2020 and 2021 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from “Outsiders”, respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. “Uncomfortable / Very Uncomfortable”, “Disagree / Strongly Disagree” with a positive statement). This category accounts for 29.0% of respondents. Two statements were altered for display to be consistent with the others (e.g. “Disagree / Strongly Disagree” consistent with negative sentiment). The two original statements were “I feel that people like me were NOT represented at RMBL” and “There was no one I felt close to at RMBL.”
Figure 15: Proportion of respondents selecting statements with the prompt “Which of the following have you experienced or witnessed while at RMBL or in a RMBL-related context? While at RMBL, someone...”. Responses are ranked according the average proportion of respondents selecting these statements in 2020 and 2021 across all respondents. The left panel displays ratings from all respondents. The center panel displays ratings from “Outsiders”, respondents that were grouped into at least one minority category according to Race / Ethnicity, Sexual Orientation, Gender Identity, Family Income, or Parents Education (representing 49.7% of respondents). The right panel displays rating from respondents that reported more than 4 items with negative sentiment (e.g. “Uncomfortable / Very Uncomfortable”, “Disagree / Strongly Disagree” with a positive statement). This category accounts for 29.0% of respondents.
How do the demographics of the RMBL community differ from national benchmarks?

Figure 16: Demographic profile of RMBL undergraduate and graduate students compared to national benchmarks. RMBL data is from responses recorded in the RMBL Portal in 2021. US Undergraduate data is from the National Center for Education Statistics collected in fall 2019 (the latest data available) and represents all students enrolled in 2-year and 4-year postsecondary degree programs at US colleges and universities that are eligible for federal student aid (Title IV institutions). US graduate student data is from the National Center for Science and Engineering Statistics (NCSES). Race and Ethnicity data in the NCSES survey is only recorded for US Citizens and Permanent Residents. The NCSES data was subset to students in 13 scientific disciplines represented in the RMBL scientist community: Biology, Biophysics, Biostatistics and bioinformatics, Botany and plant biology, Ecology and population biology, Genetics, Zoology and animal biology, Atmospheric sciences and meteorology, Geological and earth sciences, Environmental science and studies, Forestry, natural resources, and conservation. Data from respondents who listed more than one race and those that did not respond to race or ethnicity questions in the Portal are not shown.
Figure 17: Demographic profile of RMBL postdocs and university faculty compared to national benchmarks. RMBL data is from responses recorded in the RMBL Portal in 2021. US postdoc data is from the National Center for Science and Engineering Statistics (NCSES). Race and Ethnicity data in the NCSES survey is only recorded for US Citizens and Permanent Residents. The NCSES data was subset to students in 13 scientific disciplines represented in the RMBL scientist community: Biology, Biophysics, Biostatistics and bioinformatics, Botany and plant biology, Ecology and population biology, Genetics, Zoology and animal biology, Atmospheric sciences and meteorology, Geological and earth sciences, Environmental science and studies, Forestry, natural resources, and conservation. Data on RMBL professors is from the 58 people who listed “Associate Professor”, “Assistant Professor”, or “Full Professor” as their RMBL role in the Portal. Data on US full-time university faculty is from the National Center for Education Statistics (NCES) Digest of Education Statistics. Data from US Ecology and Evolution professors is from a 2018 survey of faculty that are associated with 94 doctoral programs in Ecology and Evolution that are recognized by the National Research Council and described in Jimenez et al., Nat Ecol Evol 3, 1030–1033 (2019). https://doi.org/10.1038/s41559-019-0911-5. Data from respondents who listed more than one race and those that did not respond to race or ethnicity questions in the Portal are not shown.

* Note that although women made up only 40% of professor-level members of the RMBL community in 2021 (as captured by the RMBL Portal), they represent a larger share (50%) of primary investigators with a registered research plan, indicating that a larger number of faculty-level men than women came to RMBL as visitors in 2021.