

2023 Physics and Astronomy SEA Change Annual Report

Written by Alexis V. Knaub (aknaub@aapt.org)
Physics and Astronomy SEA Change Director
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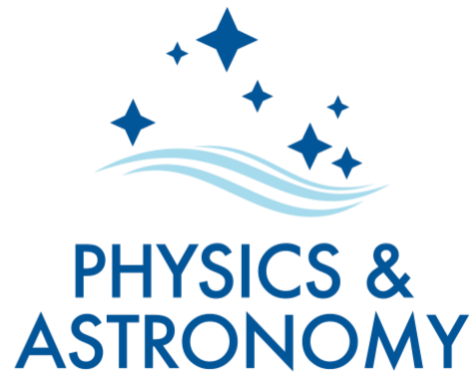


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Introduction

This report serves as a summary of Physics and Astronomy (P/A) SEA Change program activities from 2023.

This report is informed by the Physics and Astronomy SEA Change Committee (PASCC) meeting notes and documentation and observations made by director, Dr. Alexis Knaub. The PASCC chair, Dr. Beth Cunningham, also provided edits and feedback on this report before the PASCC received a copy.

P/A SEA Change has passed big milestones in 2023: awarding the first disciplinary and P/A SEA Change Bronze Award to Smith College Physics and leaving the pilot stage to become a full-fledged program. Though the path was not trivial and the overall trajectory remains uncertain given the DEI and postsecondary landscape in the US, there is much to celebrate at this time.

Physics and Astronomy SEA Change Committee (PASCC)

Beth Cunningham (AAPT), Chair for the PASCC

Alexis Knaub (AAPT), Project Manager for the Physics and Astronomy SEA Change (Director as of September 2023)

American Association of Physics Teachers (AAPT)

Robert Hilborn, AAPT
David Marasco, Foothill College

American Astronomical Society (AAS)

Stella Kafka, Am. Meteorological Soc.
Tom Rice, AAS

American Institute of Physics (AIP)

Rachel Ivie, AIP (guest until August 2023)
Jovonni Spinner, AIP
Arlene Modeste Knowles, AIP

American Physical Society (APS)

Fatima Alleyne, APS (June through August 2023)
Kathryne Sparks Woodle, APS
Monica Plisch, APS (until April 2023)

American Vacuum Society (AVS)

Sushma Kotru, Univ. Alabama.

Council on Undergraduate Research (CUR)- Physics and Astronomy

Carol Hood, Cal. State Univ.- San Bernardino

National Society of Black Physicists (NSBP)

Stephon Alexander, Brown Univ.
Stephen Roberson, Parson Corp.

National Society of Hispanic Physicists (NSHP)

Juan Burciaga, Colorado College

Optica

Marcia Lesky, Optica

Society of Physics Students (SPS)

Brad Conrad, SPS (until August 2023)
Rachel Ivie, AIP (from August 2023 on)
Jim Borgardt, Juniata College

PASCC Activities and Logistics

In 2022, the PASCC decided to meet only for an hour once a month. They met 11 times in 2023; their December meeting was canceled.



Figure 1: The three P/A SEA Change subcommittees depicted in graphical format. First is the application and awards subcommittee, second is the implementation subcommittee, and third is the sustainability subcommittee

While the three subcommittees existed in 2023, the Application and Awards Subcommittee was the only one active as the other two had significantly less to do.

Application and Awards Subcommittee

Members: Juan Burciaga, Brad Conrad, Rachel Ivie, and Bob Hilborn

This subcommittee met 5 times. They provided reviewer suggestions and led the PASCC discussion regarding the review panel. This includes individual reviewers as well as the composition of the panel to ensure the application would be reviewed fairly.

Additionally, the subcommittee advised the creation of Cohort 3. This includes creating an application to be part of Cohort 3 and other criteria to assess potential Cohort 3 departments. While any US or US-territory department could apply for Cohort 3, the subcommittee gave feedback on whether the departments seemed ready to do the P/A SEA Change work.

Implementation Subcommittee

Members: Juan Burciaga, Brad Conrad, Bob Hilborn, and Carol Hood

The Implementation subcommittee did not meet in 2023. The plan to ensure that action plans were implemented was approved in 2022. They are likely to meet in 2024.

Sustainability Subcommittee

Members: Brad Conrad, Bob Hilborn, Stella Kafka, Arlene Modeste Knowles, and Monica Plisch

The subcommittee met once to discuss sustainability, primarily finding funding to pay Knaub as the AIP Venture Partnership Funding was set to end at the end of 2023. The budgeting work that this subcommittee did in 2022 was used by AAAS to write in a subaward for P/A SEA Change which was funded in early fall by NSF through a Creativity Extension.

The Creativity Extension is for 1.5 years (started January 2024), so this subcommittee will be meeting in 2024 to figure out the next steps regarding funding as well as revisiting questions regarding volunteer labor. Volunteering is very much part of many efforts; there is just not enough money to pay everyone for all the tasks that need to be done. Creating experiences that are professionally and personally fulfilling for volunteers that advance the work is vital for sustainability.

Staffing

Knaub was again the only employee working on P/A SEA Change. She was working part-time as a program manager, focusing on the pilot. This involved working with the pilot departments, PASC, and AAAS SEA Change. Part of this work has entailed learning about all of the professional societies that have representatives on the PASC, engaging with the physics and astronomy communities interested in education, and ensuring that P/A SEA Change will be a good role model for the rest of the disciplinary STEM SEA Change groups that AAAS hopes for. At the end of 2023, Knaub became the Director of P/A SEA Change; she was originally the project manager. She is full-time with P/A SEA Change as of January 2024.

As in the past, volunteers have been critical to do this work. Besides Knaub being half-time in 2023, the volunteers provide important perspectives and do work vital to the success of this program. These volunteers not only include the PASC members (or reps) but also the reviewers who make recommendations regarding the application. The reviewers were offered a modest stipend (\$250) for their work.

Cohorts

P/A SEA Change remains the only departmental/disciplinary¹ SEA Change. Biomedical SEA Change is still working on receiving its first application.

In fall 2023, we did open recruiting for Cohort 3; this is discussed more in Cohort 3 section. The map below is color-coded to indicate which states we currently have participating departments and the relative number. There is at least one physics or astronomy department participating in P/A SEA Change in 11 states. California and Massachusetts have the highest number of departments participating. Important for this work is that there is participation in a diversity of states, given the legal challenges happening with DEI and state-level legislature.

The still engaged departments' demographics across all three cohorts are as follows:

- 13 public institutions, 9 private
- 21 physics/astronomy departments, 1 astronomy only department
- Highest physics/astronomy degree

¹ AAAS SEA Change has recently decided to use “disciplinary” programs rather than departmental. It is unclear why but P/A SEA Change is a disciplinary program while Biomedical SEA Change is not labeled as such.

- 10 Bachelor's
- 3 Master's
- 9 PhD

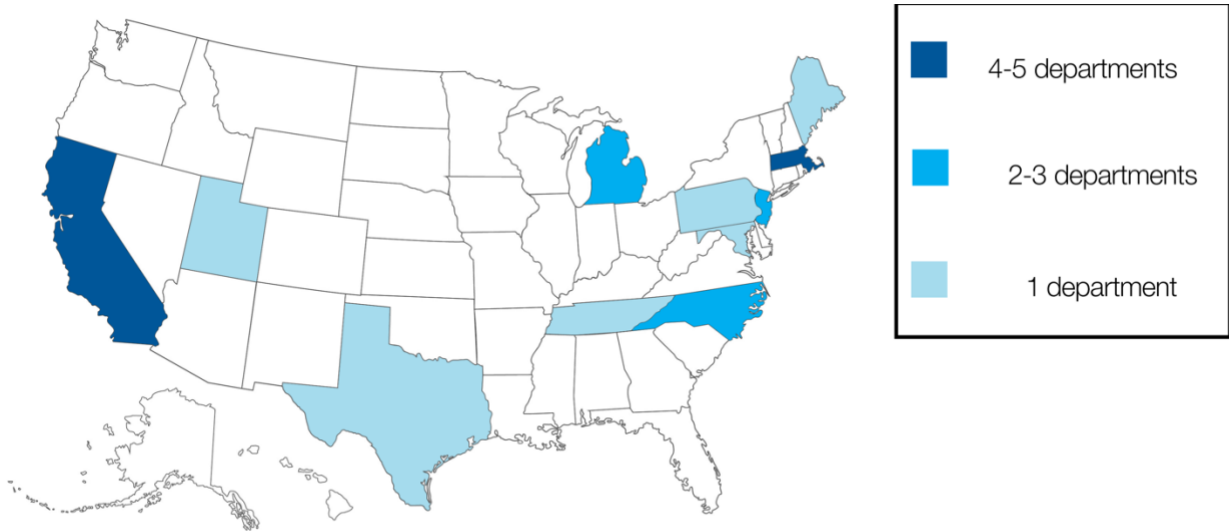


Figure 2: A map of the U.S. and where P/A SEA Change cohort departments are. The highest concentrations are in CA and MA.

Pilot Cohorts

Pilot cohort 1 was sunset in 2023. Departments needed to apply for a Bronze Award or move to a different cohort if they wished to remain engaged. One department applied, and one plans on applying. One department opted to move to cohort 3.

Cohort 2 is expected to submit their applications by the end of May 2024. Two departments plan on applying for Bronze Awards by the end of May. One department may be granted an extension towards the end of June at the latest, and two are to be determined. Departments that do not apply for a Bronze Award by the due date can move to Cohort 3. One department already has opted to move to Cohort 3. Bandwidth is the prevalent challenge for departments, a typical and understandable challenge for departments embarking on data-informed structural change.

The second cohort is still meeting virtually every other monthly; these meetings are optional. In 2023, the meeting format become more structured. For meetings, two departments report on what they have worked on and are invited to seek feedback on their efforts. This is a loose format, and it was designed to replicate some of what a research group does. The format seems to be useful, as departments get feedback and they have said that sometimes having to report out their activities is motivating.

Two of the departments in Cohort 1 have both supported and been supported by Cohort 2. They have attended one meetup to provide insights into their workflow. Each department from Cohort 1

has also sought feedback on their applications from Cohort 2. While giving feedback is optional, Cohort 2 has given feedback.

Cohort 3: the first cohort for the full program

In 2022, P/A SEA Change did not recruit for another cohort because our funding situation was unclear. AAAS SEA Change applied for an NSF Creativity Extension in early 2023 and received it. P/A SEA Change was specifically written into this grant, which provides 1.5 years of funding primarily for the Director position to be full-time.

AAAS received the good news in mid-September 2023. This made recruiting for Cohort 3 somewhat challenging, given that many national-level physics and astronomy meetings had already occurred. Unlike the pilot cohorts, this was an open process where any US-based physics/astronomy postsecondary department could apply. We received 13 applications for Cohort 3, and all joined Cohort 3. Two departments from the pilot cohorts also joined this cohort.

Because of the timescale with the subaward and knowing that P/A SEA Change process takes significant time, we stopped accepting applications for Cohort 3 on 22 November 2023. P/A SEA Change intends to recruit over a longer timescale and at a different time of year. Besides a potentially short turnaround, this period also encompasses midterms for those in the semester system and potentially the end of the quarter for those in the quarter system and is right before the Thanksgiving holiday.

Recruiting activities

Because we did not know whether there would be additional funding, we were cautious and strategic on how to recruit for much of 2023. Our recruiting activities in chronological order:

- **June 2023. *The Physics Department Chairs Meeting co-hosted by APS and AAPT.*** The AIP Venture Partnership Fund paid for a hosted dinner. Sixteen chairs who were not engaged with P/A SEA Change attended the dinner with Beth and Alexis; two individuals already engaged with P/A SEA Change (a cohort member and a PASC member) also attended. Alexis talked to small groups of faculty about P/A SEA Change and had a short list of discussion questions that the faculty could discuss regarding DEI.

In addition to the dinner, Alexis was able to give an hour-long talk on the last day of the Chairs' meeting. It was an overview of P/A SEA Change along with what was intended to be a generative discussion regarding faculty recruitment and what the chairs knew (or did not know) about their departments. This was done to support chairs in thinking broadly about their next steps as well as introduce the kind of work that P/A SEA Change could support their departments in doing.

- **October 2023. *Frontiers in Optics (FiO) Meeting.*** Marcia Lesky suggested that Alexis attends the *Frontiers in Optics* Meeting, as that was one of the few major meetings in physics/astronomy left in the year. Alexis informally engaged with attendees.
- **October 2023. *AAAS SEA Change Meeting.*** AAAS SEA Change has an annual meeting for their AAAS SEA Change members. This was held simultaneously with the Sloan Equitable Pathways grant recipients. Alexis informally engaged with faculty.

- **November 2023. AAC&U Transforming STEM Education Meeting.** Alexis, Beth Cunningham, and Beth Ruedi (AAAS) gave a presentation at this meeting.
- **November 2023. New England AAPT Meeting.** Alexis was invited to give a talk at this meeting. The talk was virtual because she was at the NSBP meeting.

Planning for cohort 4 and beyond

There have been 5 departments who have expressed interest in participating in a future cohort; four of these departments were part of the visit to the western MA area. This is promising as Cohort 3 just started in January. Awarding the first department has helped with visibility along with demonstrating that the approach has some promising signs.

First Disciplinary Bronze Awardee



Figure 3: The P/A SEA Change Bronze Award logo. The left has the AAAS SEA Change logo with one of the waves in bronze. The right side is the P/A SEA Change logo with stars and a light blue wave. Two of the stars are in bronze.

P/A SEA Change received its first Bronze application on 5 June 2023. This also marks the first disciplinary application of all SEA Change. On 19 October 2023, Smith College Physics was the first disciplinary and P/A SEA Change Bronze Awardee. AIP created the [press release](#) that was sent out on 13 November 2023.

Review Panel

In 2023, the first disciplinary SEA Change review panel was convened. This was our first time testing out the policies and procedures the *Application and Awards Subcommittee* had created. Reviewers were invited as this was the pilot and having individuals who had relevant experience, would take the work seriously, and would provide useful feedback on both the application and review processes was important. They filled out a form to become a reviewer, testing that process. Reviewers could receive a modest stipend for participating as a reviewer.

The reviewing process was similar to that of a grant review process; the review panel makes a recommendation and the PASCC decides whether to follow the recommendation. Overall, this process went well.

The review panel, consisting of 5 reviewers with one reviewer serving as the lead reviewer, convened on 10 July 2023. They had provided comments on the application via a feedback form and were asked to look over the raw feedback from each reviewer prior to the virtual panel meeting. The panel meeting lasted for 2 hours.

The reviewers thought it was overall a worthwhile endeavor, even though reviewing the application took a lot of time. However, they could not identify ways to shorten the process. One reviewer appreciated the P/A SEA Change process enough to convince their department to join Cohort 3 and included their participation in the review panel as part of their promotion dossier.

Celebrating and Awarding Smith College Physics

Once the award decision was made, Smith College Physics informed and asked who within the college should receive the good news. This was done to ensure that appropriate people were informed. The president of the college and the administrator working on equity and inclusion received a letter congratulating the department.



Figure 4: Smith College Physics faculty having dinner with Beth and Alexis. From top left clockwise: Gary Felder, Nalini Easwar, Beth Cunningham, Nat Fortune, Joyce Palmer-Fortune, Alexis Knaub

Because Smith was the first awardee, Beth and Alexis went to Smith for a day to celebrate in-person during December 2023. Smith College Physics opted to receive the award (a certificate and an acrylic award) at the AAPT Winter Meeting in 2024; each awardee selects which society's meeting they would like to receive the award.

Awarding the first department was an important step for the proof-of-concept period as well as for imagining the types of departments that could be successful in this endeavor. Having a small department receive a Bronze award is evidence that this program is not just for large or research-intensive departments. There will be more applications in 2024 and hopefully, more awardees. This will further demonstrate that the program can be done by different departments.

Current and Future Funding

Our partnership with AAAS has led to 1.5 of funding via a subaward from their NSF Creativity Extension. The subaward started in January 2024. In August 2023, Beth Cunningham, Shirley Malcom, and Alexis Knaub discussed SEA Change with NSF. They were supportive of the effort. Alexis and Beth drafted a short concept paper that will serve as a vision for the program and explain what P/A SEA Change's financial needs are for this vision.

Beth and Alexis will be contacting various entities (government and private foundations) in 2024 to explore potential funding for the longer term.

Work with AAAS

Our work with AAAS SEA Change continued in 2023. Recall that AAAS SEA Change convened disciplines to embark on creating disciplinary versions of their institution SEA Change. The work from AAAS included creating a group to adapt the institutional self-assessment for disciplines or departments. For P/A SEA Change, we have learned and adapted practices from AAAS SEA Change to best serve those in our cohorts.

Besides the funding (see above) and the AAAS SEA Change meeting that Alexis attended, AAAS has provided other important support for our work. Beth Ruedi and Shirley Malcom attended part of the first review panel to ensure that P/A SEA Change held a similar standard to AAAS SEA Change.



Figure 5: Alexis Knaub and Shirley Malcom at the AAAS SEA Change Meeting in October 2023.

In August 2023, Valeria Sinclair-Chapman began as the deputy director of AAAS SEA Change. Valeria accompanied Beth Cunningham and Alexis on their December 2023 trip to Smith College. They also visited UMass-Amherst, Mount Holyoke College, and Amherst College to gauge interest in AAAS SEA Change membership as well as whether their physics and/or astronomy departments would be interested in participating in future P/A SEA Change cohorts. This trip helped by sharing with AAAS SEA Change what P/A SEA Change has been doing and further strengthened our tie to AAAS SEA Change.

This relationship between the two SEA Changes is important because the SEA Change approach ties institutions and disciplines to one another to move up levels. P/A SEA Change has been intentional in maintaining contact with AAAS SEA Change to ensure that the P/A SEA Change program is not setting any problematic precedents as well as to support AAAS SEA

Change when other disciplines are ready to create their own disciplinary SEA Change. We have had regular communication with AAAS SEA Change, and we will continue to do so in 2024.

Online Engagement for the Broader Community

Our online engagements continue from prior years. The primary purpose is to gain brand recognition in physics and astronomy. P/A SEA Change began doing in-person engagements (e.g., at professional society conferences) during 2022, continuing and ramping more in 2023. This meant that our advertising and publicity from 2020 to spring 2022 were on virtual platforms during the pandemic. In-person engagement appears to have an important impact. Although we cannot make a causal claim, a third of Cohort 3 attended the Chairs Meeting dinner. However, the virtual engagement allows the brand to be seen by people who may not be participating in in-person events as well as provides a consistent way to advertise the program.

The online presence is not just to promote P/A SEA Change but to support other efforts and highlight promising practices that could be adopted by physics/astronomy educators. These include individuals in our cohorts.

Webinar Series

The webinar series consists of promising practices for physics/astronomy educators to adopt to improve DEI in learning spaces. The intent is to feature efforts of different scales (e.g., classroom to whole departments), focuses (e.g., general DEI to specific aspects), and populations. Alexis seeks out speakers who are active in the various societies involved with the PASCC. Additionally, these practices may be less known or used in the physics/astronomy education community. Promising practices have some level of evidence that indicate their potential; not all are rigorously studied, but there are evidence-based reasons to support these practices' adoption. The series features better known individuals alongside lesser-known individuals as way to spread invited speaker opportunities.



Figure 6: An infographic displaying the number of webinars, speakers, registered attendees, and views as of 13 February 2024.

The 2023 webinars were:

- December 2023. **P/A SEA Change Webinar on Teaching Guides**. Presenter: Joanna Behrman.
- November 2023. **Parenting and Physics: How to Support Physics Students who are Raising Children**. Presenter: Rose Young.
- Oct. 2023. **Helping our students adjust to a post-pandemic world**. Presenter: M. Wright.
- July 2023. **Amplifying student voices and creating spaces for difference**. Presenters: Kevin Aptowicz, Ph.D. (he/him/his) and Murphy Pyankov (they/them).
- April 2023. **Models and assumptions in inclusive STEM education**. Presenter: Carrie Diaz Eaton.
- March 2023. **Building a Diverse Faculty: A Bold New Paradigm for Tenure Track Searches**. Presenter: Mary James
- February 2023. **Simons-NSBP Scholar Program: Successes and Lessons Learned**. Presenters: Presenters: Bridgette Gifford, Oge Okoronkwo, and Kasey Wagoner. [Presenters did not want to be recorded]

Social Media and Web Presence

The P/A SEA Change [website](#) is mostly for consistent information such as the charter or the list of PASCC members. It is unclear how individuals engage with the site. It mostly serves to establish credibility at this point.

P/A SEA Change is on [Twitter \(currently known as X\)](#) and [Facebook](#). Recently, Alexis created [BlueSky account](#) for P/A SEA Change, because it is unclear whether Twitter will end and what social platform will essentially replace it; BlueSky seemed the most likely.

Dissemination

Publications

We have had several publications this year. They are as follows:

- **Physics and Astronomy SEA Change: 3 Years Later and Going on Three Cohorts**. APS Forum on Education Newsletter. November 2023
- **Physics and Astronomy SEA Change Updates**. AAS Committee on the Status of Women in Astronomy blog. 9 November 2023.
- **Smith College Bronze Award Press Release**. 13 November 2023.

Presentations and Conferences

P/A SEA Change had 5 presentations during 2023. They are as follows:

- January 2023. AAPT Winter Meeting. Alexis gave a ~30-minute talk on P/A SEA Change.
- March 2023. AIP Forum Assembly. This was a poster presentation.

- June 2023. Physics Chairs Meeting. Alexis gave ~45-minute interactive talk on P/A SEA Change to the department chairs.
- November 2023. AAC&U Transforming STEM Meeting. Alexis, Beth Ruedi, and Beth Cunningham gave a talk on both SEA Changes.
- November 2023. Alexis gave a ~30-minute virtual talk to the AAPT New England section.

Alexis was also at the APS Annual Leadership Meeting, APS March and April Meetings, AAPT Summer Meeting (July 2023), Optica Frontiers in Optics (October 2023), AAAS SEA Change Meeting (October 2023), and the NSBP Meeting (November 2023). The reasons for attending varied, but P/A SEA Change was brought up if only because people introduced themselves to each other; this is one of the many ways in-person interactions are part of getting the word out regarding P/A SEA Change.

Monthly Updates

The PASCC receives monthly updates. One is for internal use only and is to keep PASCC members informed. The other update is for public distribution and is sent via MailChimp. So far, there are 20 subscribers though others do open the updates as they are posted on the P/A SEA Change Twitter, P/A SEA Change BlueSky, P/A SEA Change Facebook Page, and on the AAAS Port of Call.

The PASCC seems to intermittently engage with the internal updates, but they appreciate the existence of those documents.

Summary

For 2023, the third year of this program having some staff, has reached big milestones.

- P/A SEA Change awarded the first department.
- There is more funding to continue in the shorter-term
- The program has left the pilot phase and launched into a full program with an open call for departments.

These are big steps and should be celebrated, especially given that much of this work was happening during civil unrest and anti-DEI activity in the US, at the federal and state levels, and during the pandemic. There are also signs that more departments will be awarded in the future. The tenacity to persist with all these factors is a sign of dedication to this work.

Although it is important to celebrate all these wins, there are important next steps to ensure that P/A SEA Change not only fulfills the core objectives of supporting departments in self-study and action planning but also to improve physics and astronomy so that all can thrive. This includes both the departments themselves as well as the PASCC.

The program has faced its share of challenges. The road ahead will have challenges, both those typical to any program and the legal situations in many states. However, P/A SEA Change has passed important milestones and created a program that hopefully physics and astronomy educators can be proud of. The 2024 year is looking optimistic.