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Widespread Distribution and Unexpected Variation: Science Faculty with Education Specialties (SFES) Across the U.S.

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TITLE

Widespread Distribution and Unexpected Variation: Science Faculty with Education Specialties (SFES) Across the U.S.

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Abstract: College and university science departments are increasingly taking an active role in improving science education. Perhaps as a result, a new type of specialized science faculty position within science departments is emerging – referred to here as Science Faculty with Education Specialties (SFES) – where individual scientists focus their professional efforts on strengthening undergraduate science education, improving K-12 science education, and conducting discipline-based education research. Numerous assertions, assumptions, and questions about SFES exist, yet no national studies have been published. Here we present findings from the first large-scale study of U.S. SFES, who are widespread and increasing in numbers. Contrary to many assumptions, SFES were indeed found across the nation, across science disciplines, and, most notably, across primarily undergraduate, MS-granting, and PhD-granting institutions. Data also reveal unexpected variations among SFES by institution type. Among respondents, SFES at MS-granting institutions were almost twice as likely to have formal training in science education compared to other SFES. In addition, SFES at PhD-granting institutions were much more likely to have obtained science education funding. Surprisingly, formal training in science education provided no advantage in obtaining science education funding. Our findings show that the SFES phenomenon is likely more complex and diverse than anticipated, with differences being more evident across institution types than across science disciplines. These findings raise questions about the origins of differences among SFES and are useful to science departments interested in hiring SFES, scientific trainees preparing for SFES careers, and agencies awarding science education funding.

Leadership from university-level scientists with expertise in science disciplines is critical to national efforts in the U.S. in three arenas of science education: K-12 science education (1), discipline-based education research (2), and undergraduate science education reform (3). One mechanism for advancing these three science education arenas is the presence of Science Faculty with Education Specialties (SFES) in university science departments. SFES are scientists who take on specialized roles in science education within their discipline (4-6). While these hybrid professionals have existed for decades, few studies have assessed the structure, characteristics, and success of the SFES approach to improving science education from within science departments, and these publications have examined mainly undergraduate and MS-granting public institutions located in one state (5, 6).

Here we report data on SFES across the U.S. and across science departments at public and private universities classified as PhD-granting, MS-granting, and primarily undergraduate institutions (PUIs). Three key findings about the SFES phenomenon emerged. First, our data show that the SFES phenomenon is indeed widespread and growing, with more SFES hired in the last decade than in all previous years combined. SFES respondents were from across the U.S., across science disciplines, and across multiple institutions types. Second, while U.S. SFES share common characteristics previously observed (5, 6), we discovered striking differences between SFES at different institution types, including the likelihood they are in tenure-track positions, the extent to which they are engaged in teaching versus research, their level of formal science education training, and their success in obtaining science education funding. Finally, we found that formal training in science education surprisingly gave no apparent advantage to SFES in obtaining funding to support their science education efforts. These key findings have important implications for integrating SFES into college and university science departments and maximizing their efforts to strengthen science education broadly. Each key finding is described in more detail below, as well as supported in further detail in the Supporting Information (SI).

Results

Key Finding #1: SFES are a national, widespread, and growing phenomenon

SFES in our study represented all major types of U.S. institutions of higher education, including private (26.3%) and public universities (72.7%), Community Colleges (2.4%), Primarily Undergraduate Institutions (22.8%; PUI SFES), MS-granting institutions (22.1%; MS SFES), PhD-granting institutions (50.2%; PhD SFES), and Other institution types (2.4%, SI MM3 and AA1). SFES in our study were found in 45 states, DC, and Puerto Rico.

SFES respondents had hire dates from 1966-2011 and were predominately recent hires (2000-2011) across institution types (Fig. 1A). SFES were distributed across four science disciplines [Biology (39.4%), Chemistry (23.9%), Geosciences (8.3%), and Physics (14.2%)], as well as Other Science (12.1%) (Fig. 1C; SI MM3). In our study, 52.9% of SFES were female, 95.5% were white, and a range of faculty ranks was represented (18.2% Assistant, 32.9% Associate, and 28.3% Full Professors). Most SFES (72.7%) were in tenure/d-track positions (Fig. 1B), and most SFES (85.1%) did not have tenure prior to adopting SFES roles.

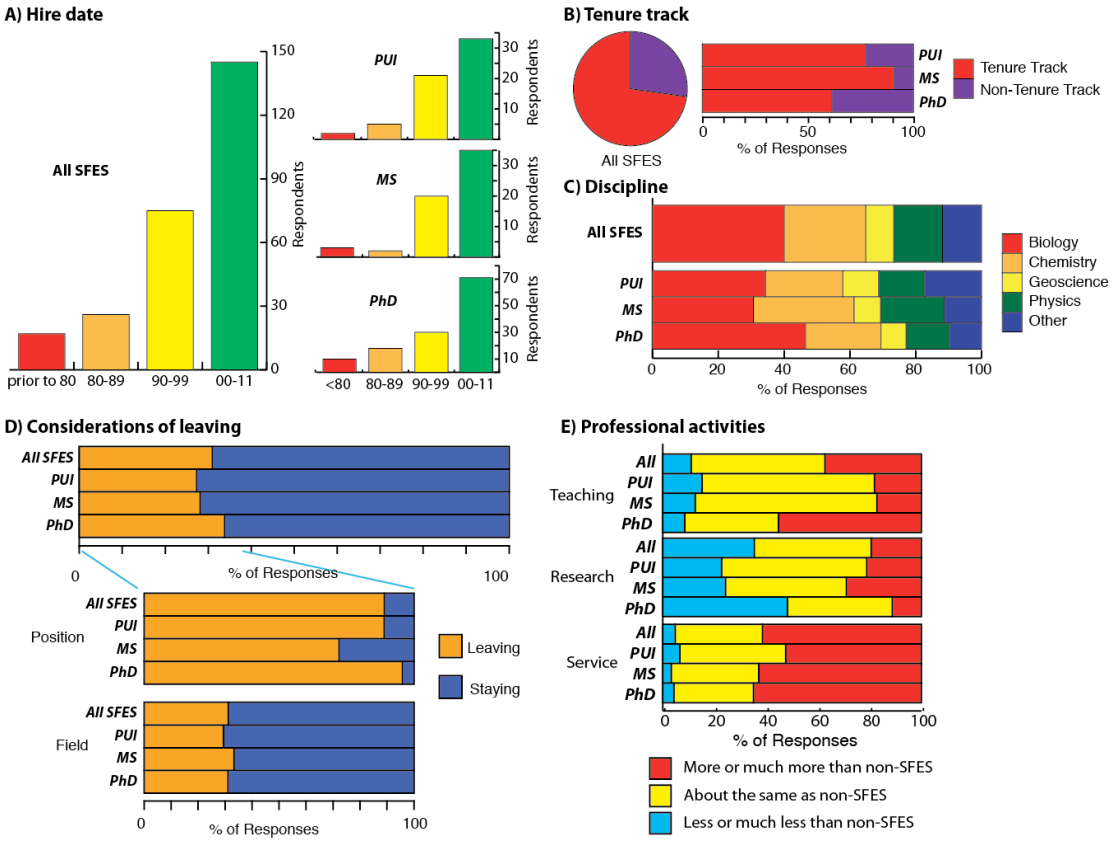

Fig. 1: U.S. SFES Characteristics Across Institution Types: Hiring History, Tenure-Track Positions, Representation across Disciplines, Considerations of Leaving, and Professional Activities. **A)** The distribution of SFES hire dates is shown on the left for All SFES (*n* = 263) and for only PUI SFES (*n* = 61, top), only MS SFES (*n* = 60, middle), and only PhD SFES (*n* = 129, bottom). **B)** The pie chart shows the percent of All SFES (*n* = 289) who asserted their position is tenured/tenure-track, and the bars on the right show these proportions for PUI SFES (*n* = 66), MS SFES (*n* = 64), and PhD SFES (*n* = 145). **C)** The proportion of survey respondents affiliated with Biology, Chemistry, Geosciences, Physics, or Other Science Departments is shown for All SFES (*n* = 283), PUI SFES (*n* = 64), MS SFES (*n* = 62), and PhD SFES (*n* = 144). **D)** The percent of SFES who reported seriously considering leaving their job is shown for All SFES (*n* = 289), PUI SFES (*n* = 66), MS SFES (*n* = 64), and PhD SFES (*n* = 145). Of those seriously considering leaving, their inclination to leave the position and the field is disaggregated below. **E)** SFES perceptions of time spent on teaching, research, and service relative to non-SFES departmental peers for All SFES (*n* = 289), PUI SFES (*n* = 66), MS SFES (*n* = 64), and PhD SFES (*n* = 141) are shown.

SFES across different institution types shared common characteristics that have been previously reported (5, 6). SFES respondents were trained extensively as researchers in basic science (94.8%; Fig. 2A). However, only 43.3% of SFES respondents had formal training in science education (Fig. 2A). Formal training in basic science was defined as post-baccalaureate training by way of a postdoctoral position and/or Ph.D. or M.S. degree. Formal training in science education was defined as post-baccalaureate training in science education by way of a postdoctoral position, Ph.D. or M.S. degree, K-12 teaching credential, and/or NSF graduate fellowship in science education.

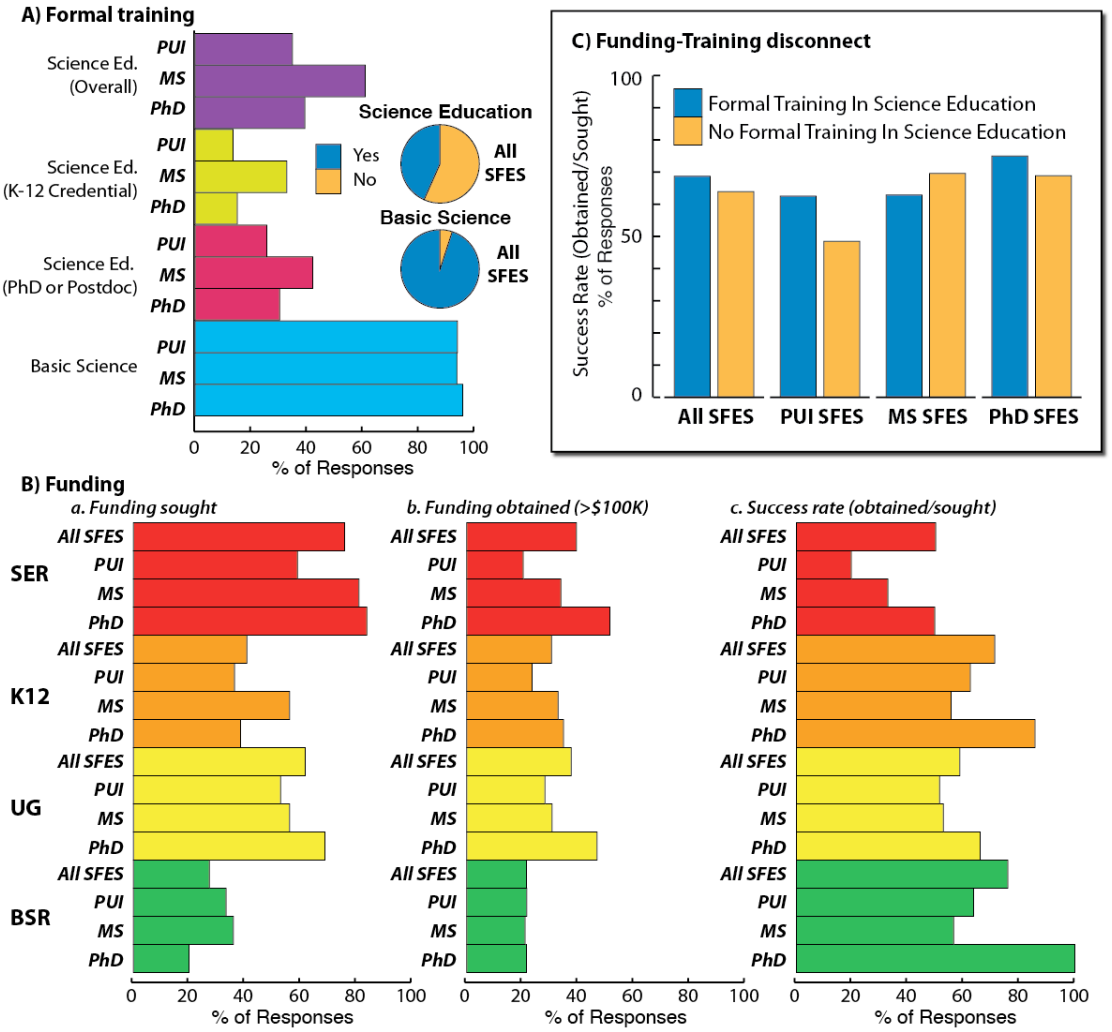

Fig. 2: Divergence in U.S. SFES Characteristics Across Institution Types: Formal Post-baccalaureate Training in Science Education and Basic Science; Perceptions of Funding; Funding Sought, Obtained, and Success Rate; and Funding-Training Disconnect. **A)** On the left, the percent of SFES who reported formal training in Science Education overall (any combination of a K-12 Credential, a Science Education PhD, and/or a Science Education Postdoctoral Fellowship), a K-12 Credential, a Science Education PhD or Postdoctoral Fellowship, and Basic Science is shown for PUI SFES (*n* = 66), MS SFES (*n* = 64), and PhD SFES (*n* = 145). Pie chart inserts represent the proportion of All SFES (*n* = 289) with formal training in *Science Education* (above) and *Basic Science* (below). **B)** The percent of SFES who reported seeking funding for their scholarly work (a. left), having obtained >$100K funding (b. middle), and their calculated funding success rates (c. right) are shown for All SFES (*n* = 289), PUI SFES (*n* = 66), MS SFES (*n* = 66), and PhD SFES (*n* = 145). **C)** The percent of SFES who both applied for funding in any science education arena and reported obtaining >$100K is disaggregated by formal training in science education for All SFES (*n* = 153), PUI SFES (*n* = 26), MS SFES (*n* = 38), and PHD SFES (*n* = 89).

For their professional activities (Fig. 1E), SFES were engaged in teaching, research, and service, with the majority of SFES across all institution types (61.5%) perceiving that they spend more time on service than non-SFES. About half (52.1%) of SFES reported being the only SFES in their department. Lastly, some SFES were “seriously considering leaving” their current

jobs (30.4%; Fig. 1D). Of these, the vast majority indicated they were considering leaving their position (89.4%) and/or institution (96.5%), rather than the field of science education (31.3%; McNemar's test $\chi 2 = 44.0$, df = 1, $P < 0.001$).

In summary, common characteristics among SFES included extensive training in basic science research, engagement in both teaching and research, a higher reported service load than non-SFES peers, and a proportion of SFES considering leaving their positions that was similar to previous reports (5, 6).

Key Finding #2: SFES differed significantly by institution type

Our data suggest, however, that the SFES phenomenon is more complex and diverse than anticipated. Contrary to common assumptions, SFES differences were more pronounced between SFES at different institution types than in different science disciplines. The analyses presented below focused on three sub-populations: SFES at PhD-granting, MS-granting, and Primarily Undergraduate Institutions, respectively labeled as PhD SFES, MS SFES, and PUI SFES. These terms signify only the institution type of the SFES, not the level or type of training held by individual SFES. The differences observed were mainly between MS SFES and PhD SFES, with PUI SFES sometimes more similar to one or the other. Four of the most striking and statistically significant differences between SFES at different institution types are detailed below.

SFES respondents at PhD institutions were less likely to occupy tenure-track positions. Our first striking difference between SFES at different institution types was the significant difference in the structure of SFES positions, in terms of tenure-status and rank. Although SFES occupied all faculty ranks, we observed a trend where PhD-granting institutions had the lowest proportion of Full Professors as compared to MS-granting institutions and PUIs. In addition, a higher combined percentage of Instructor/Lecturer and "Other" ranks were found at PhD-granting institutions, compared to MS-granting institutions and PUIs ($P = 0.003$). Notably, PhD-granting institutions had the lowest proportion of tenure/d-track SFES, as compared to MS-granting institutions and PUIs ($P < 0.001$; Fig. 1B).

These findings suggest that PhD institutions may be more often structuring some SFES positions as non-tenure-track positions as compared to other institution types. However, these data appear to be in conflict with the strong tradition of tenure-track, discipline-based education research faculty in physics and chemistry departments. Our results may reflect the large proportion of SFES respondents in biology, though no statistical differences were detected between science disciplines on the measures described above. These data may also support the conclusion that there are sub-types of PhD SFES, for example tenure-track PhD SFES with more emphasis on research versus non-tenure-track PhD SFES with a greater emphasis on teaching.

SFES respondents at PhD institutions report spending more time on teaching and less time on research than their non-SFES peers. A second striking difference among SFES at different institution types was that they reported different profiles of what their SFES faculty position entailed. When asked about time spent on professional activities compared to non-SFES peers, the profiles of PhD SFES compared to MS and PUI SFES diverged for both teaching and research. PhD SFES had the highest proportion (Fig. 1E) reporting they teach *more* than non-SFES, whereas only low proportions of MS SFES and PUI SFES reported this ($P < 0.001$). In addition, PhD SFES had the highest proportion reporting spending *less* time on research than non-SFES peers, which is about double that for MS SFES and PUI SFES ($P < 0.001$; Fig. 1E). When directly probed about their conceptualizations of SFES positions across the U.S. more generally, the majority of SFES characterized SFES positions as a

combination of teaching, service, and research, with MS SFES having the highest proportion reporting so, as compared to PhD SFES and PUI SFES (P = 0.039). Regardless of institution type, only 13.9% of SFES asserted that SFES positions are primarily teaching positions.

These differences in perceived time spent on teaching and research may be related to the higher proportion of non-tenure-track PhD SFES described above, who may also be in faculty positions with greater emphasis on teaching. Alternatively, primarily undergraduate and MS-granting institutions may be actively constructing SFES positions to be quite similar to non-SFES peers, with similar time spent on teaching versus research, but with a scholarly focus on science education. Regardless of the origins, similarities or differences between SFES and their departmental peers have significant implications for the enfranchisement of SFES in departmental decision-making, the extent to which their science education efforts are integrated into the culture of the department, and the likely longevity of these SFES positions.

SFES respondents at MS institutions were more likely to have formal science education training. A third striking difference among SFES across institution types was whether or not they had formal science education training and the nature of that training (Fig. 2A, SI AA2). A significantly higher proportion of MS SFES (60.9%) had formal training in science education than did PhD SFES (39.3%) or PUI SFES (34.8%; $\chi 2$ = 11.0, df = 2, P = 0.004). These findings suggest that MS-granting institutions may be more actively hiring and retaining SFES with formal training in science education than are other institution types. This concentration of science education-trained SFES at MS-granting institutions is striking, and its origins are unclear.

SFES respondents at PhD institutions were more likely to have obtained science education funding. Finally, the fourth striking difference among SFES at different institution types was multiple significant differences among PhD, MS, and PUI SFES in obtaining science education funding (Fig. 2B). Funding sought, obtained, and success rate by SFES were examined for the three key science education arenas – K-12 science education, discipline-based education research, and undergraduate science education reform, as well as basic science research (SI AA2). SFES across all institution types reported applying for funding in all three arenas of science education (Fig. 2a). In terms of those who applied for and obtained funding, the success rate for PhD SFES was significantly higher than for MS and PUI SFES in all three science education arenas: undergraduate science education (P = 0.013), K-12 science education (P = 0.026), and discipline-based science education (P < 0.001; Fig. 2Bc). Over 80% of SFES in our study reported seeking funding in at least one of these science education arenas, and only 24.2% reported seeking funding in all three (Fig. 2Ba). Within each institution type, the highest proportion of SFES sought funding for Science Education Research, while the lowest proportion sought funding for Basic Science Research.

These data suggest that, as a group, PhD SFES respondents were most likely to have obtained science education funding, even though PhD SFES as a group are least likely to have formal science education training and least likely to be in a tenure-track, higher rank faculty position. That said, if there are subtypes of SFES at PhD-granting institutions, it may be primarily a subset of PhD SFES – perhaps those who have formal training in science education, are in tenure-track positions, and have job expectations that emphasize research – who are obtaining science education funding.

Key Finding #3: Formal training in science education is not associated with success in obtaining science education funding

To test the hypothesis presented above that a subset of PhD SFES may be driving statistically higher rates of funding success, we examined the relationship between science education funding success and formal science education training among all SFES. For the purpose of this analysis, we have defined funding success as *cumulatively* obtaining $100K or more in their current position. Surprisingly, we found that SFES with formal training in science education had no apparent advantage in obtaining funding in science education. For SFES who applied for science education funding in any of the three arenas, formal training in science education appeared to have no impact on obtaining funding over $100K (Fig. 2C). Among all SFES, 68.7% of those with formal science education training successfully obtained funding, as compared to 63.9% of those without formal science education training (Fig. 2C; $P = 0.547$), regardless of institution type.

To investigate which characteristics of SFES were predictors of science education funding success, we performed logistic regression analysis (SI AA3). The following six predictive factors were tested: 1) applied versus did not apply for science education funding, 2) formally trained versus not formally trained in science education, 3) tenure-track versus non-tenure-track position, 4) disciplinary field (Biology, Chemistry, Geology, Physics, Other Science), 5) institution type (PhD, MS, PUI), and 6) prior success versus lack of success in obtaining basic science research funding. We found four factors that were statistically related to science education funding success. These factors were that an SFES: 1) had applied for science education funding ($P < 0.001$), 2) was in a tenure-track position ($P=0.017$), 3) was at a PhD-granting institution ($P = 0.008$), and 4) had obtained basic science research funding ($P = 0.022$). We were unable to detect significant effects due to disciplinary field ($P = 0.582$), and quite strikingly, formal training in science education ($P = 0.302$).

These data support the conclusion that formal science education training currently provides no advantage for SFES in obtaining science education funding. Rather funding success is most closely associated with SFES in tenure-track positions at PhD institutions who have also obtained basic science research funding. Since these characteristics are not associated with PhD SFES respondents as a group, our data may support the conclusion that only a particular subset of PhD SFES in unique SFES positions may be experiencing science education funding success among PhD SFES more generally. Finally, the disconnect between formal science education training and science education funding success would suggest that funding is perhaps being awarded to SFES regardless of training, which has significant implications for the impact of these science education funding efforts.

Discussion

Understanding the growing SFES phenomenon

The widespread and growing occurrence of SFES across the U.S. confirms that the SFES phenomenon is robust, extensive, and expanding. What is driving this growth, and are national policy agencies providing explicit direction and support? What has been the impact of SFES on science education, and what factors promote SFES success? Perhaps individual institutions and/or science departments are engaging in science education by hiring, in most cases as shown by the data, a single SFES within a department to promulgate the transformation across a department. How effective is this model, and are there other models that bear emulating (e.g., hiring a cohort of SFES)? Also, contrary to some beliefs, SFES respondents as a group do not hold primarily teaching positions or primarily discipline-based education research positions, and it is important that science education stakeholders realize and acknowledge these areas of expertise are not the same. Increasing the number of SFES positions may not result in

improvements in science education if those positions suffer from misalignment between SFES expertise and the expectations for the position.

Exploring the origins of SFES differences by institution type

Unexpected differences in SFES profiles across institution types in our sample indicate that the SFES phenomenon may be context-dependent, with the contrasts between MS SFES and PhD SFES being most strongly evident, while PUI SFES were typically similar to one or the other. Variation in SFES characteristics by institution type raises questions about the origins of these differences. SFES at MS-granting institutions show the highest proportions of SFES who are tenure/d track, higher ranked, trained in science education, and report professional expectations being similar to non-SFES peers at their institutions. Perhaps MS-granting institutions are constructing SFES positions to be typical tenure-track, science faculty positions and explicitly envisioning SFES as providing expertise in an area of specialization (education) analogous to specialization in other areas (e.g., ecology or organic chemistry).

PhD SFES respondents show lower proportions of SFES who are tenure/d track and have training in science education and higher proportions of SFES reporting teaching more and engaging in less scholarly activity than non-SFES peers. Despite examples to the contrary among discipline-based education researchers, one wonders if there are a subset of PhD SFES positions that are being constructed as non-tenure-track, primarily teaching positions? Perhaps PhD SFES are simply a more heterogeneous population than SFES at other institution types. If so, what are the implications stemming from the greater frequency of funding being awarded to SFES at PhD institutions? Perhaps science education funding is being directed toward PhD SFES who are driving science education reform, such as transforming undergraduate science curriculum. However, if such funding is being directed toward academic climates in which PhD SFES occupy less enfranchised roles within PhD science departments, then the resources may not substantially improve science education at these institutions.

PUI SFES respondents show the lowest proportion of Hired-SFES (SI MM3), which may indicate that the SFES phenomenon is only recently emerging in this context. However, PUI SFES, along with MS SFES, have the highest proportion reporting professional expectations being similar to non-SFES peers. Perhaps PUI science faculty generally view science education as integral to their occupation, and little distinction exists between SFES and non-SFES at PUIs.

It may well be that variation in SFES profiles is being driven by intentional decision-making and leadership at the institutional, college, and/or department level. On the other hand, individuals with specific characteristics may be gravitating towards institution types based on personal choice, although the structure of the position and culture of the institution may be influencing that choice. Future research, both within a single institution and across multiple institutions, that investigates a wider range of stakeholder perspectives (SFES, administrators, and non-SFES peers) is needed to understand what may be driving these institution-type differences in SFES positions and how institutional culture may be supporting or limiting science education efforts.

Examining SFES training and funding for advancing science education

Surprisingly, formal training in science education provided no advantage in obtaining science education funding among our respondents. This finding raises significant questions about the SFES phenomenon and major concerns for national efforts to improve science education. If training is not a benefit in seeking funding to support SFES science education efforts, then what are the reasons? Perhaps current science education training pathways are insufficient and need to be strengthened, more formalized, and/or more extensive. National policy makers and

science education agencies could evaluate and/or develop realistic training models that are more effective than current pathways. If SFES with training are no more successful in obtaining funding for their scholarly efforts than those without training, then possibly fewer trained SFES have the ability to meet tenure and promotion criteria. More significantly, fewer trained SFES are directing the funding resources for science education.

Interestingly, obtaining science education funding was associated with three meaningful SFES characteristics: tenure/d-track position, at a PhD institution, and previous funding for basic science research. PhD SFES in our sample, however, have the most individuals who are in non-tenure-track, primarily teaching positions. Potentially the vast majority of funding is being channeled toward academic climates that are less likely to support SFES with the status to transform a science department. As a result, current funding efforts to advance science education may be achieving limited success.

In summary, specialized faculty positions focused on science education within science departments are widespread and growing, but with unexpected variations at different institution types and no clear advantage of having formal science education training in obtaining science education funding. These data suggest multiple hypotheses about SFES to be tested in future interview-based and randomized sample survey studies. Clearly, these national findings have implications for the role and impact of SFES at institutions of higher education, especially in terms of determining SFES training and hiring criteria, formulating national science education policy regarding higher education efforts to improve science education, and examining the impact of the current distribution of science education funding.

Methods

Sample and data collection

Due to a lack of a sampling frame for SFES in the U.S., a nationwide outreach was launched between September 2009 and March 2011 to build a pool of SFES for this study. Extensive announcements through email broadcasts and flyers were sent to a dozen professional societies in the sciences and multiple science education societies. A total of 973 individuals registered in our online registry. Of these registrants, individuals who self-identified that they were not SFES (n = 102), who were located outside of the U.S. (n = 22), or who were identified as high school educators (n = 8) were excluded from the subject pool. The remaining 841 SFES in the U.S. were invited by email to complete a 95-question, face-validated, anonymous, online survey (SI Survey Instrument) and also asked to recruit additional likely SFES in the U.S. to participate. No compensation was provided to either the participants or their referrals. Between March and June 2011, a total of 427 individuals participated in the online survey, producing an effective sample of 289. The rest (n = 138) were not included in the analysis because their questionnaires were incomplete or that they did not qualify for our definition of SFES (SI MM1). These individuals participated without compensation, and remained anonymous throughout data collection and analysis. Completion of data collection was based on the rationale that upon survey closure, the initial participant population of 427 provided a sufficiently large sample to discern effect sizes greater than 17% at the $P < 0.05$-level, for comparisons within the respondent population. Although this was a convenience sample, our subjects reflected a purposefully broad spectrum of our target population (SI MM1).

Analyses presented here are based on data from 289 individuals with n-values for responding SFES varying per question; surveys from an additional 138 respondents were not useable because they did not meet the study inclusion criteria (SI MM1). For operational definitions of

categories, see the Supporting Information Materials and Methods (SI MM3). For additional analyses and data tables, see the Supporting Information Additional Analyses (SI AA).

Statistical analyses

We completed Pearson's chi-squared and McNemar's (7) tests to compare SFES subpopulations at the $P < 0.05$ level. Pearson chi-squared tests of independence were used to assess whether paired observations, e.g., responses of SFES from different institution types, were independent of each other. McNemar's test was used to compare paired proportions, such as comparing SFES from different institution types and disciplines who were "seriously considering leaving" their "position" or "field." Logistic regression analysis was used to test for factors associated with funding success in science education (SI MM2). Probability values less than 0.05 were used to reject the null hypothesis for all statistical tests. In order to describe a more complete picture of SFES at each institution type, non-tenure/d-track SFES were included in the descriptive and statistical analyses. Inclusion of non-tenure/d-track SFES did not change statistical significance at the $P < 0.05$ level. Resulting statistical differences represented comparisons among SFES respondents with different characteristics, which may or may not generalize to all U.S. SFES.

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Supporting Information

Widespread Distribution and Unexpected Variation: Science Faculty with Education Specialties (SFES) Across the U.S.

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SI Materials and Methods (MM)

1. Sample and data collection

a. Overview

Science Faculty with Education Specialties (SFES) are defined as individuals in science departments who self-identify as university science faculty or academic staff members who take on specialized roles within science education in their discipline, either as part of their official job expectations or because they chose to focus on science education beyond their own classroom teaching and more than typical faculty in science departments. The research design for this study used a non-probabilistic, non-randomized sampling approach that generated a sample that may or may not be representative of the entire population of SFES. Below we describe the reasons for choosing this method of sampling, efforts made to make the sample as broad as possible, and the relationship between the sampling method and our interpretation of the results.

b. Rationale for employing a non-probabilistic, non-random sampling approach

The primary rationale for employing a non-probabilistic, non-random sampling approach in this study was that U.S. SFES are an emerging phenomenon that has not previously been described or characterized. There are currently no sources to which we could go that could provide a national list of SFES (i.e., sampling frame) from which we could have constructed a probabilistic, randomly selected sample of SFES.

c. Efforts made to maximize the breadth of the sample within this approach

Given that a probabilistic, randomized sample was not possible, we employed a volunteerism approach to construct a broad convenience sample that could provide information on the nature and extent of SFES across the U.S. To maximize the breadth of this convenience sample, we developed a list of likely SFES who would be eligible study participants. This was accomplished through a National SFES Search conducted via email between September 2009 and March 2011. Invitations for individuals to self-identify as SFES were sent to over a dozen professional societies in the sciences that have members involved in science education, as well as to multiple science education societies. Recipients of these invitations were further asked to forward the invitation to other individuals who they thought were likely to be SFES. The result was a database of 973 individual names of likely SFES with contact email addresses.
Inclusion criteria to be invited to participate in this first study of SFES in the U.S. were intentionally kept broad, so as to minimize exclusion and have a convenience sample with as much breadth as could be achieved. Of the registrants from the National SFES Search, there were 841 individuals who self-identified as SFES, who were located inside the U.S., and who were identified as college- or university-based educators, and who included an email address. These individuals constituted our convenience sample and were invited by email to participate in our study and to forward the study invitation to other likely U.S. SFES. Between March and June 2011, 427 individuals participated in our national study without compensation. Assuming that the majority of those participants had previously registered with us as likely SFES, ~44% participated in the study.

Of the 427 surveys we received, the following were excluded from analysis: incomplete surveys (n = 77), surveys submitted by individuals who reported they were: a graduate student (n = 1), a postdoctoral fellow (n = 2), not SFES (n = 40), or not in a science department (n = 18). Analyses presented are based on data

from 289 individuals with n-values for responding SFES varying per question. To prevent inadvertent or indirect disclosure of research participants, data were reported in aggregate.

d. The relationship between the sampling method and interpretation of the results
Given the level of knowledge of SFES at the current time and the necessity of using a non-probabilistic, non-random, non-comprehensive sampling approach, our results may not be representative of the entire U.S. SFES population. We offer a few additional considerations about our sample. First, the data are self-reported and may suffer from over-reporting at the extremes, i.e., there may be more responses from faculty who want to vent or to brag. Second, for smaller subgroups only larger effect sizes would have been detectable, e.g., comparisons between Geosciences and Physics require effect sizes greater than 30%. Another limitation is that the sample had too few respondents from community colleges (AA-granting institutions) to include their data in statistical comparisons by institution type; such comparisons were limited to SFES from PhD-granting, MS-granting, and primarily undergraduate institutions. Despite these limitations, we believe the data provide some useful measures of the SFES model at the national level. We anticipate that readers will be interested in considering to what degree the findings generalize to their own institution and discipline. Furthermore, the findings can inform discussions about U.S. science faculty engaged in science education efforts, including assumptions and potential impact associated with these positions.

2. Statistical analyses
We completed Pearson's chi-squared and McNemar's tests to compare SFES subpopulations at the $P < 0.05$ level. Chi-squared statistics are Pearson's unless specifically noted to be McNemar's. Pearson chi-squared tests of independence were used to assess whether paired observations, e.g., responses of SFES from different institution types, were independent of each other. A chi-squared probability of < 0.05 was used to justify rejecting the null hypothesis that the values were unrelated to each other. McNemar's test (1) was used to compare paired proportions, such as comparing SFES from different institution types and disciplines who were "seriously considering leaving" their "position" or "field." A chi-squared probability of < 0.05 was used to justify rejecting the null hypothesis that there were no differences between two correlated proportions, such as the proportions of faculty responding about leaving their position and field. Logistic regression analysis was used to test for factors associated with funding success in science education. Logistic regression was carried out using IBM SPSS Statistics Version 20. Results and evidence supporting the constructed model are summarized in Tables S9 and S10. Probability values less than 0.05 were used to reject the null hypothesis for all statistical tests.

In order to describe a more complete picture of SFES at each institution type, non-tenure/d-track SFES were included in the descriptive and statistical analyses. Inclusion of non-tenure/d-track SFES did not change statistical significance at the $P < 0.05$ level.

3. Operational Definitions
a. Other Science. SFES positions were distributed across four science discipline departments [Biology (39.4%, $n = 114$), Chemistry (23.9%, $n = 69$), Geosciences (8.3%, $n = 24$), and Physics (14.2%, $n = 41$)], as well as Other Science (12.1%, $n = 35$). "Other Science" represented positions not clearly designated as one of the previous four science disciplines, and examples include departments of Life and Environmental Sciences, Natural Sciences, Physical Sciences, Veterinary Science, and Exercise Science.

b. Other Institution Types. SFES positions in our sample represented all types of U.S. institutions of higher education, including community colleges (2.4%, $n = 7$), primarily undergraduate institutions (22.8%, $n = 66$), Master's-degree granting institutions (22.1%, $n = 64$), Ph.D.-granting institutions (50.2%, $n = 145$), and Other institution types (2.4%, $n = 7$). "Other institution types" represented institutions that SFES respondents found hard to categorize as one of the previous four institution types, and examples include medical science, other health science, and field stations.

c. Hired-SFES and Transitioned-SFES. Two subpopulations of SFES were identified: Hired-SFES (49.1%, $n = 142$) were specifically hired to fill SFES roles and Transitioned-SFES (34.6%, $n = 100$) transitioned to SFES roles from their initial faculty roles (2, 3), while the remaining SFES were unsure

(16.3%, *n* = 47). PUI SFES had the lowest proportion of Hired-SFES compared to MS-granting and PhD-granting institutions (*P* = 0.002).

d. Formal Training. Formal training in basic science was defined as post-baccalaureate training by way of a postdoctoral position and/or Ph.D. or M.S. degree. Formal training in science education was defined as post-baccalaureate training by way of a postdoctoral position, Ph.D. or M.S. degree, K-12 teaching credential, and/or NSF GK12 or another graduate fellowship in science education.

e. PhD SFES, MS SFES, and PUI SFES. The analyses for SFES differences by institution type focused on three sub-populations: SFES at Ph.D.-granting, M.S.-granting, and Primarily Undergraduate Institutions, respectively labeled as PhD SFES, MS SFES, and PUI SFES. These terms are merely labels that signify the institution type of the SFES, not the level or type of training held by individual SFES.

SI Additional Analyses (AA)

1. SFES Disciplinary Distribution

SFES were found across disciplines and across institution types (Table S1).

Table S1: Disciplinary distribution at each institution type.

PhD-granting	N	%
Biology	67	46.5
Chemistry	33	22.9
Geoscience	11	7.6
Physics	19	13.2
Other	14	9.7
Total	144	100
MS-granting		
Biology	19	30.6
Chemistry	19	30.6
Geoscience	5	8.1
Physics	12	19.4
Other	7	11.3
Total	62	100
PUI		
Biology	22	34.4
Chemistry	15	23.4
Geoscience	7	10.9
Physics	9	14.1
Other	11	17.2
Total	64	100
Community College		
Biology	1	14.3
Chemistry	2	28.6
Geoscience	1	14.3
Physics	1	14.3
Other	2	28.6
Total	7	100
Other		
Biology	5	83.3
Chemistry	0	0.0
Geoscience	0	0.0
Physics	0	0.0
Other	1	16.7
Total	6	100

2. SFES Differences Across Institution Types

Because of a low response rate, respondents from Community College and Other institution types were excluded from analyses by institution type.

a. SFES Perceptions of Time Spent on Professional Activities. When asked about time spent on professional activities relative to non-SFES peers, the profiles of PhD SFES compared to MS and PUI SFES diverged for both teaching and research (Table S2).

Table S2: Percent (number) of SFES at each type of institution who say they spend less, more, or about the same amount of their time for teaching activities or for scholarly activities as non-SFES colleagues in their department.

Teaching Activities	PUI	MS	PhD	
Less	15.2% (10)	12.5% (8)	8.5% (12)	
Same	66.7% (44)	70.3% (45)	36.2% (51)	
More	18.2% (12)	17.2% (11)	55.3% (78)	
Total	100% (66)	100% (64)	100% (141)	271

Scholarly Activities	PUI	MS	PhD	
Less	22.7% (15)	24.2% (15)	48.2% (68)	
Same	56.1% (37)	46.8% (29)	40.4% (57)	
More	21.2% (14)	29.0% (18)	11.3% (16)	
Total	100% (66)	100% (62)	100% (141)	269

b. The Structure of SFES Positions. SFES positions, in terms of rank and tenure-status, diverged across institutions types (Tables S3, S4, and S5).

Table S3: Percent (number) of SFES at each type of institution who transitioned to or were hired as faculty who specifically specialize in science education beyond typical teaching duties. “Not sure” responses were excluded from analysis.

	PUI	MS	PhD	
Transitioned	59.6% (34)	31.4% (16)	33.9% (42)	
Hired	40.4% (23)	68.6% (35)	66.1% (82)	
Total	100% (57)	100% (51)	100% (124)	232

Table S4: Percent (number) of SFES survey responses from each institution type at each rank.

	PUI	MS	PhD	
Instructor/Lecturer	7.6 % (5)	3.2% (2)	14.0% (20)	
Assistant	18.2% (12)	17.5% (11)	19.6% (28)	
Associate	33.3% (22)	33.3% (21)	32.9% (47)	
Full	34.9% (23)	41.3% (26)	17.5% (25)	
Other	6.1% (4)	4.8% (3)	16.1% (23)	
Total	100% (66)	100% (63)	100% (143)	272

Table S5: Percent (number) of SFES at each type of institution who not tenure track vs. tenure track.

	PUI	MS	PhD	
Not Tenure Track	22.7% (15)	9.4% (6)	38.6% (56)	
Tenure Track	77.3% (51)	90.6% (58)	61.4% (89)	
Total	100% (66)	100% (64)	100% (145)	232

c. SFES Perceptions of Job Expectations. Perceptions of job expectations diverged among PhD, MS, and PUI SFES. Many SFES (60.7%) reported having similar job expectations compared to non-SFES peers, however PhD SFES had the lowest proportion (49.3%) reporting so, compared to MS SFES (69.4%) and PUI SFES (74.2%; $\chi2 = 14.0$, df = 2, $P = 0.001$). Specifically, some SFES reported job expectations that were similar to those of non-SFES with respect to obtaining external grant funding (58.4%), publishing peer-reviewed articles (67.2%), and mentoring research students (56.6%). In all cases, however, PhD SFES had the lowest proportions (44.9%, 51.1%, 43.6%) reporting that these job expectations were similar to those of non-SFES, in contrast to MS SFES (87.5%, 94.8%, 72.2%) and PUI SFES (66.1%, 77.4%, 71.7%) (respectively, $\chi2 = 28.3$, df = 2, $P < 0.001$; $\chi2 = 39.4$, df = 2, $P < 0.001$; $\chi2 = 19.4$, df = 2, $P < 0.001$).

d. Formal Science Education Training. A significantly higher proportion of MS SFES (60.9%) had formal training in science education than did PhD SFES (39.3%) or PUI SFES (34.8%; $\chi2 = 11.0$, df = 2, $P = 0.004$). For example, 32.8% of MS SFES had earned K-12 teaching credentials, compared to 15.2% of PhD SFES and 13.6% of PUI SFES ($\chi2 = 10.6$, df = 2, $P = 0.005$). Yet, MS SFES still had significantly higher proportions of individuals with formal science education training even when those with only K-12 teaching credentials ($n = 16$) were removed from the analysis ($\chi2 = 8.2$, df = 2, $P = 0.017$). Of note, 42.2% of MS SFES had doctoral degrees and/or post-doctoral training in science education, compared to 30.3% of PhD SFES and 25.8% of PUI SFES.

e. SFES Funding Success. For the purpose of this analysis, we have defined funding success as obtaining $100K or more in their current position. This is a metric of career funding success. In terms of reaching this $100K threshold (Fig. 2Bb), a higher proportion of PhD SFES (51.4%) obtained funding to support Science Education Research, compared to MS SFES (33.9%) and PUI SFES (20.3%; $\chi2 = 18.9$, df = 2, $P < 0.001$). Similarly, a higher proportion of PhD SFES (46.8%) obtained funding to support Undergraduate Science Education, compared to MS SFES (30.6%) and PUI SFES (28.1%; $\chi2 = 8.6$, df = 2, $P = 0.013$). Higher proportions of PhD SFES (34.8%) and MS SFES (32.8%) obtained funding to support K-12 Science Education, compared to PUI SFES (23.4%); $\chi2 = 2.7$, df = 2, $P = 0.026$). While we have used $100K as our threshold for funding success, some SFES obtained over $1 million in total funding: PhD SFES (37.6%), MS SFES (29.7%), and PUI SFES (19.7%).

In terms of those who applied for funding and obtained funding, the success rate for PhD SFES was higher in all three science education arenas than for MS and PUI SFES (Fig. 2Bc, Tables S6 and S7). For Science Education Research, the success rate for PhD SFES was 49.7%, compared to MS SFES (32.8%) and PUI SFES (19.7%; $\chi2 = 17.3$, df = 2, $P < 0.001$). For K-12 Science Education, the success rate for PhD SFES was 85.7%, compared to MS SFES (55.6%) and PUI SFES (62.5%; $\chi2 = 11.0$, df = 2, $P = 0.004$). For Undergraduate Science Education, the success rate for PhD SFES was 66.0%, compared to MS SFES (52.8%) and PUI SFES (51.4%; $\chi2 = 3.4$, df = 2, $P = 0.187$). These findings suggest an advantage for obtaining funding at PhD institutions.

Table S6: Percent (number) of SFES at each type of institution who sought funding for Science Education Research.

Funding sought	PUI	MS	PhD
K-12 Science Education	36.4% (24)	56.3% (36)	38.6% (56)
Undergraduate Science Education	53.0% (35)	56.3% (36)	69.0% (100)
Science Education Research	59.1% (39)	81.3% (52)	84.1% (122)
Total	100% (64)	100% (64)	100% (145)

Table S7: Percent (number) successfully funded SFES with and without formal science education training at each type of institution.

Formal Science Education Training	Total	PUI	MS	PhD
YES	68.7% (68)	62.5% (10)	62.9% (22)	75% (36)
NO	63.9% (85)	48.5% (16)	69.6% (16)	68.8% (53)

3. Factors that Contribute to SFES Funding Success

Logistic regression analysis identified four factors that were statistically related to science education funding success (Tables S8 and S9). Not surprisingly, SFES who applied for funding in science education ($P < 0.001$) were 16.054 times more likely to receive funding in science education. Also, those in tenure track positions ($P = 0.017$) were 2.323 times more likely to receive funding than those in non-tenure track positions. SFES at PhD institutions ($P = 0.008$) were 3.054 times more likely to receive funding in science education than those at PUI institutions and 2.15 times more likely than those at MS institutions. Lastly, SFES who obtained basic science research funding ($P = 0.022$) were 2.511 times more likely to receive science education funding. We were unable to detect significant correlations for disciplinary field ($P = 0.582$), and quite strikingly, for formal training in science education ($P = 0.302$).

Table S8: Logistical regression analysis of 261 SFES regarding funding success in science education by IBM SPSS Statistics (Version 20).

	β	S.E. β	Wald χ^2	df	*P*	Exp(β)
Constant	-4.002	0.754	28.200	1	< 0.001	0.018
Tenure Track	0.843	0.354	5.685	1	0.017	2.323
Field*			2.857	4	0.582	
Chemistry	0.320	0.371	0.743	1	0.389	1.377
Geoscience	0.604	0.546	1.223	1	0.269	1.829
Other	0.301	0.509	0.349	1	0.554	1.351
Physics	0.663	0.451	2.156	1	0.142	1.940
Institution**			9.773	2	0.008	
MS	0.351	0.417	0.709	1	0.400	1.420
PhD	1.117	0.373	8.942	1	0.003	3.054
Applied for Sci. Ed Funding	2.776	0.636	19.035	1	< 0.001	16.054
Basic Sci. Research Funding	0.921	0.402	5.238	1	0.022	2.511
Formal Training in Sci. Ed.	0.324	0.315	1.064	1	0.302	1.383

Test	χ^2	df	*P*
Overall model Evaluation			
Omnibus Tests of Model Coefficients	68.157	10	< 0.001
Goodness-of-fit test			
Hosmer & Lemeshow	7.871	8	0.446

* Biology is the reference category for field.

** PUI is the reference category for institution type. -2 Log likelihood=286.54, Cox and Snell R^2 =0.230, Nagelkerke R^2 = 0.309

Table S9: The observed and predicted frequencies for funding success in science education by logistic regression with the cutoff of 0.50.

	Predicted		
Observed	Yes	No	% Correct
Yes	58	51	53.2
No	21	131	86.2
Overall % Correct			72.4

1. McNemar Q (1947) Note on the sampling error of the difference between correlated proportions or percentages. Psychometrika 12:153-157.

SI Survey Instrument

A National Study of Science Faculty with Education Specialties (SFES)

Informed Consent Letter
A National Study of Science Faculty with Education Specialties (SFES) in the United States

Dear Colleague,

You are being asked to participate in a research study conducted by Dr. Seth Bush from the Department of Chemistry & Biochemistry at Cal Poly San Luis Obispo. Dr. Bush is part of research team that includes: Dr. Nancy Pelaez at Purdue University, Dr. James Rudd at CSU Los Angeles, Dr. Michael Stevens at Utah Valley University, Dr. Kimberly Tanner at San Francisco State University and Dr. Kathy Williams at San Diego State University.

You were selected as a possible participant in this study because you were identified to us as a college or university science faculty or academic staff member who has specialized science education responsibilities beyond those of typical science faculty on your campus. Your participation in this study is voluntary.

PURPOSE OF THE STUDY
The purpose of this study is to investigate the characteristics, experiences, and responsibilities of Science Faculty with Education Specialties (SFES) in the United States.

PROCEDURES
You will be asked to complete an on-line survey that asks you questions about your current professional position and professional activities, as well as your perceptions about issues related to your position. If you volunteer to participate in this study, you will complete the survey anonymously using a secure website. You will be giving us permission to read, analyze, and report data resulting from your anonymous responses to the survey. The survey should take approximately 45 minutes to 1 hour to complete.

POTENTIAL RISKS AND DISCOMFORTS
You are unlikely to be exposed to any potential risks or discomforts by participating in this study.

POTENTIAL BENEFITS TO YOU AND/OR SOCIETY
There may be some direct benefits to you by participating in this study. You may find the survey enhances your awareness of one or more issues that impact your professional success. Reported findings may include information that would have the potential for improving your administrative support, financial support, and career opportunities. Higher education, and science education in particular, will potentially benefit from an investigation of the experiences of this group of faculty. University administrators, faculty candidates, and faculty hires will have data that may enhance hiring and retention success for this type of faculty position.

PAYMENT FOR PARTICIPATION
You will not be paid for participating in this research project.

CONFIDENTIALITY AND ANONYMITY
Your identity will be kept strictly confidential during the entire research process, and the survey data itself will be collected anonymously. We are interested in the set of responses as a whole, not a particular individual's responses. Anonymous data or findings from this study might be included in various publications or presentations. The survey data will be stored in a secure, locked location for up to five years from the collection date.

PARTICIPATION AND WITHDRAWAL
You can choose whether to participate, and you may withdraw from the study at any time. Choosing not to participate or choosing to withdraw at any point will mean that your responses will not be included in data analysis or reporting for research purposes.

IDENTIFICATION OF INVESTIGATORS
If you have any questions or concerns about the study, please feel free to contact Dr. Bush, who can be reached at (801) 756-2746 or by email at sbush@calpoly.edu.

RIGHTS OF RESEARCH PARTICIPANTS
If you have questions or concerns regarding the manner in which the study is conducted, you may contact Steve Davis, Chair of the Cal Poly Human Subjects Committee, at (805) 756-2754, sdavis@calpoly.edu, or Susan Opava, Dean of Research and Graduate Programs, at (805) 756-1508, sopava@calpoly.edu.

Thank you in advance for your time. Seth Bush

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*1. I have read the procedures described above. By checking "Agree" below, I am electronically signing this document and consenting to participate in this study. Agree Disagree

Overview ...
While all college and university science faculty are education specialists in some regard through their teaching responsibilities, here we define Science Faculty with Education Specialties (SFES) as faculty either:

1) who have been specifically hired in science departments to specialize in science education beyond typical faculty teaching duties.
OR
2) who have transitioned after their initial hire to a role as a faculty member focused on issues in science education beyond typical faculty teaching duties.

This National Study of Science Faculty with Education Specialties (SFES) in the United States intends to collect descriptive information about SFES across different science disciplines and across different types of higher education institutions. In addition, the study also aspires to collect evidence from university science faculty or academic staff who occupy a variety of positions – not just tenured/tenure-track positions – and who are engaged in a variety of activities related to science education.

To capture the characteristics of this varied population, the survey contains the following eight sections:
1. On Your Position ...
2. About Your Teaching Activities ...
3. About Your Scholarly Activities ...
4. About Your Service Activities ...
5. About Your Professional Training ...
6. About Your Professional Satisfaction ...
7. For the Future ...
8. About You ...

At the beginning of each section, there will be an introductory page that gives an overview of the content of the section.

As SFES ourselves, we have attempted to streamline the survey to minimize the time required for its completion. That said, we have endeavored to create a survey that will enable you to fully describe your situation, with ample opportunity to provide optional, open-ended comments. You should expect to spend 45 minutes to 1 hour completing this survey. To minimize potential technical difficulties in completing the survey, we encourage you to complete it in one sitting if at all possible. If this is not possible, please continue to use the same computer and the same browser, so that you can return to your same survey in progress.

While we have designed this survey to capture the SFES experience for individuals across disciplines and types of institutions, we acknowledge that there may be places where you are unable to fully express the

nature of your current professional position. Please use the comment boxes at the end of each section and at the end of the survey to share additional information about your situation that you feel is important.

Thank you in advance for your time and thoughtfulness in completing the survey.

On Your Position ...
In this section of the survey, you will be asked about whether you consider yourself an SFES, the characteristics of your current academic position, and how others in your institution may perceive your position.

2. What year were you hired into your current position? Year: (XXXX)

3. Consider your current position. Mark all that apply.
- I have specialized science education role(s) beyond typical science faculty on my campus and beyond my classroom teaching.
- Specializing in science education was part of my official job expectations when I was hired.
- Specializing in science education was NOT part of my official job expectations when I was hired but it IS CURRENTLY.
- Specializing in science education has NEVER been part of my official job expectations.
- I am enfranchised in my campus's academic governance system (e.g., I am able to serve on the faculty senate or vote at faculty meetings).
- My current position is a tenured/tenure-track position.
- I had tenure before first adopting a specialized science education role.
- I am a university science faculty or academic staff member.
- None of these apply.

4. At what rank were you hired in your current position?

Emeritus	Lecturer	Other
Full	Instructor	If Other, please elaborate.
Associate	Adjunct	
Assistant	Visiting Professor	

5. What is your current rank?

Emeritus	Lecturer	Other
Full	Instructor	If Other, please elaborate.
Associate	Adjunct	
Assistant	Visiting Professor	

Based on our definition of SFES as faculty either:
1) who have been specifically hired in science departments to specialize in science education beyond typical faculty teaching duties. OR
2) who have transitioned after their initial hire to a role as a faculty member focused on issues in science education beyond typical faculty teaching duties.

6. Do you consider yourself to be a Science Faculty with an Education Specialty (SFES), as described above? Yes No, I don't consider myself to be an SFES because ... (please comment)

7. Which of the following best describes your current position as a Science Faculty with an Education Specialty (SFES)?
- I was HIRED into a science faculty position, specifically to specialize in science education beyond typical faculty teaching duties
- I TRANSITIONED into a specialized science education role, beyond typical faculty teaching duties, after being hired into a science
- I am not sure either of these choices best describes my position because ... (please comment)

8. What is the full name of the SCIENCE DEPARTMENT that houses your position? _____

9. Which field designation best reflects the SCIENCE DEPARTMENT that houses your current position?
Biology Chemistry Geoscience Physics Other If Other, please elaborate.

10. Were you hired 100% into this SCIENCE DEPARTMENT?
Yes No. Briefly describe how your appointment is structured. _____

11. Approximately what percentage of your current appointment (assumed to be 100%) is …
to the SCIENCE DEPARTMENT that houses your position? (0%-100%, by 5% increments)
outside of the SCIENCE DEPARTMENT that houses your position? (0%-100%, by 5% increments)

12. Which best describes your INSTITUTION?
Institution Type: Public Private Other
Student Enrollment: Less than 500; 500-999; 1000-4,999; 5000 - 9,999; 10,000-19,999; 20,000-29,999; more than 30,000
Institution Classification:
Community College or two-year degree granting Institution
Primarily Undergraduate Institution
Master's-degree granting Institution
Ph.D.-granting Institution
Other
Institution State: (US States and Territories)
Other (please specify)

13. Not including yourself, does your department or college currently have any Science Faculty with Education Specialties?
Department: Yes No
College: Yes No
Other (please specify): Yes No

14. Please choose one of the following responses to indicate to what extent you agree with each statement.
Strongly agree Agree Disagree Strongly disagree No basis for judgment
I am fulfilled by my current position.
I am doing the job I thought I was hired to do.

About Your Teaching Activities ...
Considering your current position.
In this section of the survey, you will be asked about the TEACHING activities, responsibilities, and opportunities you have as an SFES. Please only consider the activities associated with your current position in answering the questions below.

15. Compared to typical non-SFES faculty members in my department, I currently teach
_____ units per quarter or semester.
many more
more
about the same number of
fewer
far fewer
no basis for judgment
Please feel free to comment on the amount of time you spend on teaching. _____

16. Have you taught or are you currently teaching courses in the following categories? Mark all that apply.
Lower division majors core
Upper division majors core
Majors elective
General education

Service courses for other programs (not related to K-12 teacher training)
Interdisciplinary courses
Graduate majors core
Graduate majors elective
Methods course for future K-12 teachers
Science courses specifically for future K-12 teachers
Science courses specifically to support in-service K-12 teachers
Undergraduate level courses in science education
Graduate level courses in science education
None of these apply
Other courses (please specify)

17. Are there courses that you are currently expected to teach that non-SFES faculty are NOT expected to teach? Yes No

18. Are there courses in the following categories that you are currently expected to teach that non-SFES faculty are NOT expected to teach? Mark all that apply.
Lower division majors core
Upper division majors core
Majors elective
General education
Service courses for other programs (not related to K-12 teacher training)
Interdisciplinary courses
Graduate majors core
Graduate majors elective
Methods course for future K-12 teachers
Science courses specifically for future K-12 teachers
Science courses specifically to support in-service K-12 teachers
Undergraduate level courses in science education
Graduate level courses in science education
None of these apply
Other courses (please specify)

19. Are there courses that you are currently precluded from teaching because of your SFES status?
Yes No

20. Which of the following categories of classes are you currently precluded from teaching because of your SFES status? Mark all that apply.
Lower division majors core
Upper division majors core
Majors elective
General education
Service courses for other programs (not related to teaching)
Interdisciplinary courses
Graduate majors core
Graduate majors elective
Methods course for future K-12 teachers
Science courses specifically for future K-12 teachers
Science courses specifically to support in-service K-12 teachers
Undergraduate level courses in science education
Graduate level courses in science education
None of these apply
Other courses (please specify)

21. Please choose one of the following responses to indicate to what extent you agree with each statement.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

I am currently fulfilled by my teaching activities.
I am teaching the courses that I thought I was hired to teach.
I am teaching course(s) that I do not want to teach because I am an SFES.
I am teaching course(s) that I did not expect to teach because I am an SFES.

22. Please feel free to make additional comments about your teaching situation as an SFES. ____

In this section of the survey, you will be asked about the SCHOLARLY activities, responsibilities, and opportunities associated with your current academic position.

Here, we define scholarly activities broadly. Scholarly activities can include research, but are not limited to research. Below, you will be asked questions about four specific arenas of scholarly activities in which SFES may engage.
These arenas are:
1) Basic Science Research
2) Science Education Research
3) K-12 Science Education Activities
4) Undergraduate Science Education Activities

We realize that there will be some overlap in the four arenas delineated above. In addition, you will also be asked questions about your scholarly activities overall.

Please only consider the activities associated with your current position in answering the questions below.

23. Compared to typical non-SFES faculty members in my department, I spend _____ of my time engaged in scholarly activities.
much more
more
about the same amount
less
much less
no basis for judgment
Please feel free to comment on the amount of time you spend on scholarly activities. ____

In responding to the following questions, please consider Basic Science Research to be research in the sciences that does not include science education.

24. In your work as an SFES, are you currently involved in BASIC SCIENCE RESEARCH? Yes No

Consider your scholarly activities that focus on the arena of BASIC SCIENCE RESEARCH.
25. In your current position have you: (mark all that apply)
Published articles in peer reviewed journals that relate to your scholarly activities in this arena?
Applied for grants to support your scholarly activities in this arena?
Presented results of your scholarly activities in this arena at regional, national or international conferences?
None of these apply.

26. Considering your current position, to what extent do you agree with the following statements?

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Publishing in this arena advances my own personal scholarly interests.
Obtaining grant money in this arena advances my own personal scholarly interests.
Presenting at regional, national or international conferences in this arena advances my own personal scholarly interests.
My department is supportive of my scholarly activities in this arena.
I am expected to engage in this arena differently than my non-SFES peers.

Engaging in this arena is important for my career development, including tenure and/or promotion.
I am currently fulfilled by my scholarly activities in this arena.
I am doing the scholarly activities that I thought I was hired to do in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of research in this arena.
CURRENTLY, I feel that my department has a culture supportive of research in this arena.

About Your Scholarly Activities ...
In responding to the following questions, please consider the following description of Science Education Research.

Here we ask that you consider any research in science education including but not limited to: research on issues of student conceptions, teaching and learning strategies, equity and diversity in the sciences, discipline-based science education issues, and the role of scientists in science education generally.

27. In your work as an SFES, are you currently involved in SCIENCE EDUCATION RESEARCH?
Yes No

Consider your scholarly activities that focus on the arena of SCIENCE EDUCATION RESEARCH.
28. In your current position have you: (mark all that apply)
Published articles in peer reviewed journals that relate to your scholarly activities in this arena?
Applied for grants to support your scholarly activities in this arena?
Presented results of your scholarly activities in this arena at regional, national or international conferences?
None of these apply.

29. Considering your current position, to what extent do you agree with the following statements?
Strongly agree Agree Disagree Strongly disagree No basis for judgment
Publishing in this arena advances my own personal scholarly interests.
Obtaining grant money in this arena advances my own personal scholarly interests.
Presenting at regional, national or international conferences in this arena advances my own personal scholarly interests.
My department is supportive of my scholarly activities in this arena.
I am expected to engage in this arena differently than my non-SFES peers.
Engaging in this arena is important for my career development, including tenure and/or promotion.
I am currently fulfilled by my scholarly activities in this arena.
I am doing the scholarly activities that I thought I was hired to do in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of research in this arena.
CURRENTLY, I feel that my department has a culture supportive of research in this arena.

In responding to the following questions, please consider K-12 Science Education Activities as including but not limited to K-12 curriculum development, teacher preparation and professional development projects, and diversity and outreach projects.

30. In your work as an SFES, are you currently involved in K-12 SCIENCE EDUCATION ACTIVITIES?
Yes No

Consider your scholarly activities that focus on the arena of K-12 SCIENCE EDUCATION.
31. In your current position have you: (mark all that apply)
Published articles in peer reviewed journals that relate to your scholarly activities in this arena?
Applied for grants to support your scholarly activities in this arena?
Presented results of your scholarly activities in this arena at regional, national or international conferences?
Conducted research in this area?
None of these apply.

32. Considering your current position, to what extent do you agree with the following statements?
Strongly agree Agree Disagree Strongly disagree No basis for judgment
Publishing in this arena advances my own personal scholarly interests.
Obtaining grant money in this arena advances my own personal scholarly interests.
Presenting at regional, national or international conferences in this arena advances my own personal scholarly interests.
My department is supportive of my scholarly activities in this arena.
I am expected to engage in this arena differently than my non-SFES peers.
Engaging in this arena is important for my career development, including tenure and/or promotion.
I am currently fulfilled by my scholarly activities in this arena.
I am doing the scholarly activities that I thought I was hired to do in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of ACTIVITIES in this arena.
CURRENTLY, I feel that my department has a culture supportive of ACTIVITIES in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of RESEARCH in this arena.
CURRENTLY, I feel that my department has a culture supportive of RESEARCH in this arena.

In responding to the following questions, please consider Undergraduate Science Education Activities as including but not limited to curriculum development, instructional training for faculty or graduate teaching assistants, and recruitment/retention outreach projects.

33. In your work as an SFES, are you currently involved in UNDERGRADUATE SCIENCE EDUCATION ACTIVITIES? Yes No

Consider your scholarly activities that focus on the arena of UNDERGRADUATE SCIENCE EDUCATION.
34. In your current position have you: (mark all that apply)
Published articles in peer reviewed journals that relate to your scholarly activities in this arena?
Applied for grants to support your scholarly activities in this arena?
Presented results of your scholarly activities in this arena at regional, national or international conferences?
Conducted research in this area?
None of these apply.

35. Considering your current position, to what extent do you agree with the following statements?
Strongly agree Agree Disagree Strongly disagree No basis for judgment
Publishing in this arena advances my own personal scholarly interests.
Obtaining grant money in this arena advances my own personal scholarly interests.
Presenting at regional, national or international conferences in this arena advances my own personal scholarly interests.
My department is supportive of my scholarly activities in this arena.
I am expected to engage in this arena differently than my non-SFES peers.
Engaging in this arena is important for my career development, including tenure and/or promotion.
I am currently fulfilled by my scholarly activities in this arena.
I am doing the scholarly activities that I thought I was hired to do in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of ACTIVITIES in this arena.
CURRENTLY, I feel that my department has a culture supportive of ACTIVITIES in this arena.
PRIOR to my hiring, I had the impression that my department had a culture supportive of RESEARCH in this arena.
CURRENTLY, I feel that my department has a culture supportive of RESEARCH in this arena.

Consider your current scholarly activities as a whole, including your efforts in Basic Science Research, Science Education Research, K-12 Science Education Activities, and Undergraduate Science Education Activities.

36. To what extent do you agree with the following statements.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

My department is supportive of my scholarly activities.
I am currently fulfilled by my scholarly activities.
I am doing the scholarly activities that I thought I was hired to do.
I am expected to garner about the same amount of grant money as non-SFES faculty members in my department.
I have the same academic freedom in developing research projects as my non-SFES peers.
I am expected to publish about the same number of peer-reviewed research articles as non-SFES faculty members in my department.
I am expected to mentor about the same number of research students (undergraduate, graduate and/or postdoctoral) as non-SFES faculty members in my department.
I have adequate lab space to accomplish my scholarly activities.
UNLIKE my non-SFES peers, I am pressured to apply for grants that do not support my research or other personal scholarly interests.
PRIOR to my hiring, I had the impression that my department had a culture supportive of RESEARCH in basic science.
CURRENTLY, I feel that my department has a culture supportive of RESEARCH in basic science.
PRIOR to my hiring, I had the impression that my department had a culture supportive of RESEARCH in science education.
CURRENTLY, I feel that my department has a culture supportive of RESEARCH in science education.
PRIOR to my hiring, I had the impression that my department had a culture supportive of ACTIVITIES in science education.
CURRENTLY, I feel that my department has a culture supportive of ACTIVITIES in science education.

Consider your current scholarly activities as a whole.

37. In your current position...

(Response options: $0; $1 to $10K; $10K to $49K; $50K to $99K; $100K to $499K; $500K to $1 million; $1 million to $2 million; $2 million to $5 million; $5 million to $10 million; More than $10 million)

How much grant money have you obtained in total?
How much grant money have you obtained to support BASIC SCIENCE RESEARCH?
How much grant money have you obtained to support SCIENCE EDUCATION RESEARCH?
How much grant money have you obtained to support K-12 SCIENCE EDUCATION?
How much grant money have you obtained to support UNDERGRADUATE SCIENCE EDUCATION?

38. In your entire career as an SFES ...

(Response options: $0; $1 to $10K; $10K to $49K; $50K to $99K; $100K to $499K; $500K to $1 million; $1 million to $2 million; $2 million to $5 million; $5 million to $10 million; More than $10 million)

How much grant money have you obtained in total?
How much grant money have you obtained to support BASIC SCIENCE RESEARCH?
How much grant money have you obtained to support SCIENCE EDUCATION RESEARCH?
How much grant money have you obtained to support K-12 SCIENCE EDUCATION?
How much grant money have you obtained to support UNDERGRADUATE SCIENCE EDUCATION?

39. Some people have held multiple academic positions in their career. Please indicate the total number of years for your entire career as an SFES (including your current position). _____ Years

40. My department supports a graduate program. Yes No

41. The number of graduate student researchers available to participate in my scholarly activities is _____ the number available to participate in the scholarly activities of non-SFES faculty in my department.

much more than
more than
about the same as
less than
much less than

Please choose one of the following responses to indicate to what extent you agree with each statement.

42. PRIOR TO MY HIRING, my department had a GRADUATE curriculum for students interested in SCIENCE TEACHING equivalent to the curriculum for students interested in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)j

Degree option(s)

43. PRIOR TO MY HIRING, my department had a GRADUATE curriculum for students interested in RESEARCH in SCIENCE EDUCATION equivalent to the curriculum for students interested in RESEARCH in BASIC SCIENCE .

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

Please choose one of the following responses to indicate to what extent you agree with each statement.

44. CURRENTLY, my department has a GRADUATE curriculum for students interested in SCIENCE TEACHING equivalent to the curriculum for students interested in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

45. CURRENTLY, my department has a GRADUATE curriculum for students interested in RESEARCH in SCIENCE EDUCATION equivalent to the curriculum for students interested in RESEARCH in BASIC SCIENCE .

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

Please choose one of the following responses to indicate to what extent you agree with each statement.

46. PRIOR TO MY HIRING, my department had an UNDERGRADUATE curriculum for students interested in SCIENCE TEACHING equivalent to the curriculum for students interested in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

47. PRIOR TO MY HIRING, my department had an UNDERGRADUATE curriculum for students interested in RESEARCH in SCIENCE EDUCATION equivalent to the curriculum for students interested in RESEARCH in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

Please choose one of the following responses to indicate to what extent you agree with each statement.

48. CURRENTLY, my department has an UNDERGRADUATE curriculum for students interested in SCIENCE TEACHING equivalent to the curriculum for students interested in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

49. CURRENTLY, my department has an UNDERGRADUATE curriculum for students interested in RESEARCH in SCIENCE EDUCATION equivalent to the curriculum for students interested in RESEARCH in BASIC SCIENCE.

Strongly agree Agree Disagree Strongly disagree No basis for judgment

Course(s)

Degree option(s)

50. Please feel free to make additional comments about your scholarly activity situation as an SFES. ____

This National Study of SFES in the United States expands on research published by our team on SFES in the California State University (CSU) system.

In order make direct comparisons between United States SFES and CSU SFES, for the next two questions you will be asked to reflect on your scholarly activities using the same lens as our CSU study. The choices are similar to the four arenas of scholarly activities described earlier.

51. In your current position, what types of scholarly activities are you engaged in or have you engaged in?
    Please mark all that apply.
    Research in science education
    Research in basic science (not related to science education)
    Curriculum development
    K-12 teacher development projects, e.g., recruitment, retention, professional development activities, etc.
    University teacher development projects, e.g., TA training, faculty workshops, etc.
    Other (please specify)

52. In your current position, what types of projects have you applied for grant funding to support?
    Please mark all that apply.
    Research in science education
    Research in basic science (not related to science education)
    Curriculum development
    K-12 teacher development projects, e.g., recruitment, retention, professional development activities, etc.
    University teacher development projects, e.g., TA training, faculty workshops, etc.
    Other (please specify)

About Your Service Activities ...
In this section of the survey, you will be asked about the SERVICE activities, responsibilities, and opportunities associated with your current academic position.

Here, service activities are broadly defined as including but not limited to committee work, coordination duties, teacher preparation, evaluation and assessment, and other service outside of your institution. Please only consider the activities associated with your current position in answering the questions below.

53. Compared to typical non-SFES faculty members in my department, I spend _____ of time engaged in service activities.
    much more
    more
    about the same amount
    less
    much less
    no basis for judgment
    Please feel free to comment on the amount of time you spend on service. _____

54. Are there service activities in the following categories in which you have been engaged or are currently engaged? Mark all that apply.
    Service in my department(s)
    Service in the science college (e.g., College of Science, College of Natural & Social Sciences, College of Science & Engineering, ...)
    Service in the education college (e.g., College of Education)
    Committee service at the university level
    Coordination duties for courses that include supervision and/or training

Coordination duties for courses that include curriculum development
K-12 teacher preparation activities for pre-service teachers, including recruitment efforts
Activities for in-service K-12 teachers, such as professional development workshops
Evaluation or assessment activities, such as program review, curriculum assessment, etc.
Other service activities in your professional field outside of your institution, e.g., professional societies, grant agencies, etc. (please specify in the textbox below)
None of these apply.
Other service activities (please specify)

55. Are there service activities that you are currently expected to do DIFFERENTLY than non-SFES faculty in your department? Yes No

56. Which of the following service activities are you currently expected to do differently than non-SFES faculty in your department? Mark all that apply.
Service in my department(s)
Service in the science college (e.g., College of Science, College of Natural & Social Sciences, College of Science & Engineering)
Service in the education college (e.g., College of Education)
Committee service at the university level
Coordination duties for courses that include supervision and/or training
Coordination duties for courses that include curriculum development
K-12 teacher preparation activities for pre-service teachers, including recruitment efforts
Activities for in-service K-12 teachers, such as professional development workshops
Evaluation or assessment activities, such as program review, curriculum assessment, etc.
Other service activities in your professional field outside of your institution, e.g., professional societies, grant agencies, etc. (please specify in the textbox below)
None of these apply.
Other service activities (please specify)

57. Please choose one of the following responses to indicate to what extent you agree with each statement.
Strongly agree Agree Disagree Strongly disagree No basis for judgment
I am currently fulfilled by my service activities.
I am doing the service activities that I thought I was hired to do.

58. Please feel free to make additional comments about your service situation as an SFES. _____

About Your Professional Training ...
In this section of the survey, you will be asked about your formal and informal professional training.

The first group of questions will ask you about your training in SCIENCE, while the second group of questions will ask you about your training in SCIENCE EDUCATION. Please keep this distinction in mind as you reply to the questions in this section.

Consider your professional training in SCIENCE.
59. Please identify your FORMAL training in SCIENCE. Mark all that apply, even if you have also done more advanced work.
Postdoc in science field in a science department or college
Postdoc in science field in a national laboratory
Ph.D. in science field from a science department or college
Masters Degree in science field from a science department or college
Bachelors Degree in science field from a science department or college
Minor in science field from a science department or college
Course work in science field from a science department or college
Graduate level research in science
Undergraduate level research in science

None of these apply
Other formal training (please elaborate)

60. Please identify your INFORMAL or LESS FORMAL training in SCIENCE. Mark all that apply.
Experience in private sector, e.g., industrial experience
Experience in the public sector, e.g., national labs experience
Sabbatical experience
On the job experience
Professional development workshops, seminars or short courses
Self taught
None of these apply
Other informal or less formal training (please elaborate)

Consider your current scholarly activities as a whole.

61. Please identify your FORMAL training in SCIENCE EDUCATION. Mark all that apply, even if you have also done more advanced work.
Postdoc in science education in a science or education department
Ph.D. with an education emphasis from a science department
Ph.D. or equivalent degree from an education department
Graduate level research in science education
Undergraduate level research in science education
Minor in education
K-12 teaching credential
NSF GK-12 graduate fellowship
NSF Postdoctoral Fellowship in Science, Math, Engineering, or Technology Education (PFSMETE)
Other NSF sponsored graduate fellowship in science education
Other NSF sponsored postdoctoral fellowship in science education
None of these apply
Other formal training (including other NSF sponsored training) (please elaborate)

62. Please identify your INFORMAL or LESS FORMAL training in SCIENCE EDUCATION. Mark all that apply.
Experience in private sector, e.g., industrial experience
Experience in the public sector, e.g., national labs experience
Sabbatical experience
On the job experience
K-12 teaching experience
Professional development workshops, seminars or short courses
Self taught
TA Training program in graduate school
Science education training programs in graduate school
Leadership experience on science education project
None of these apply.
Other informal or less formal training (please elaborate)

63. Aside from the training marked above, have you held any previous academic positions that provided training in science education? Yes No If Yes, please elaborate.

About Your Professional Satisfaction ...

This section will ask a wide range of questions that center on your professional satisfaction associated with your current academic position. A subset of questions will ask you to make comparisons between SFES and non-SFES in your department. Although we are asking you to respond only about your current position, at the end of this section you will be given an opportunity to provide a career perspective and express any additional information about your current or past professional positions.

64. Please choose one of the following responses to indicate to what extent you agree with this statement.
I am professionally satisfied in my current position.
Strongly agree Agree Disagree Strongly disagree Prefer not to answer

65. Are you confident that the retention/tenure/promotion review committees at your institution are qualified to review your accomplishments as an SFES? Yes No.
If "No," what would give you greater confidence in the review process? _____

Please choose one of the following responses to indicate to what extent you agree with each statement.
66. I am confident that the work I do is UNDERSTOOD by my …
Strongly agree; Agree; Disagree; Strongly disagree; No basis for judgment; Not applicable
Department:
Division:
College:
Institution:

67. I am confident that the work I do is VALUED by my …
Strongly agree; Agree; Disagree; Strongly disagree; No basis for judgment; Not applicable
Department:
Division:
College:
Institution:

68. I am confident that my _____ and I are in AGREEMENT about my JOB EXPECTATIONS.
Strongly agree; Agree; Disagree; Strongly disagree; No basis for judgment; Not applicable
applicable
Department:
Division:
College:
Institution:

69. SFES and non-SFES faculty in my department have similar job expectations.
Strongly agree Agree Disagree Strongly disagree No basis for judgment

70. The differences in job expectations between SFES and non-SFES have been directly articulated to me. Yes No

71. Please choose one of the following responses for each statement.
(Response options: much more than; more than; about the same as; less than; much less than; No basis for judgment)
My CURRENT salary is _____ the salaries of non-SFES peers in my department with similar years of service.
My STARTING salary was _____ the salaries of non-SFES peers in my department with similar years of service.
My START-UP PACKAGE was _____ the start-up package of non-SFES peers in my department.

72. My lab space is _____ the lab space of my non-SFES peers in my department.
much bigger than
bigger than
about the same as
about the same as because faculty in my department do not have lab space
smaller than
much smaller than

73. Briefly, what were your original reasons for taking your current position? _____

74. Briefly, what are the primary reasons you continue to stay in your current position? _____

75. Thank you for the information you provided about your current professional position in the previous questions.

We anticipate that some individuals – in particular those who occupy community college positions, who hold non-tenure track positions, who have held multiple academic positions in their career, or others with unique situations – may have additional information to share that was not specifically probed above. As such, we invite you to express any additional information about your current or past professional positions that you feel are important to share in this investigation of SFES in the United States. _____

76. Are you seriously considering leaving your current: POSITION, FIELD, or INSTITUTION?
Yes No

77. I am seriously considering leaving my current _____.

	Strongly agree	Agree	Disagree	Strongly disagree	Prefer not to answer
POSITION:					
FIELD:					
INSTITUTION:					

78. Have any of the following expectations placed on you led you to think about leaving? Mark all that apply.
Teaching expectations
Scholarly expectations
Service expectations
None of these apply

79. Which of the following issues have led you to think about leaving? Mark all that apply.
The amount (load) of TEACHING is too high.
The type(s) of classes that I am expected to teach.
The type(s) of classes that I am restricted from teaching.
The difference in teaching expectations between SFES and non-SFES.
The amount (load) of SCHOLARSHIP is too high.
The type(s) of scholarly activities that I am expected to do.
The type(s) of scholarly activities that I am restricted from doing.
The difference in scholarly expectations between SFES and non-SFES.
The amount (load) of SERVICE is too high.
The type(s) of service that I am expected to do.
The type(s) of service that I am restricted from doing.
The difference in service expectations between SFES and non-SFES.
My current salary relative to non-SFES at my institution.
My lab space relative to non-SFES at my institution.
I lack confidence that the retention/tenure/promotion review committees at my institution are qualified to review my accomplishments as an SFES.
OTHER ISSUES not identified above (please specify in the textbox below).
Textbox to specify other issues not identified above.

80. If I had known about these issues before I accepted my current position, I would not have accepted.
Strongly agree; Agree; Disagree; Strongly disagree; No basis for judgment; Not applicable
Please explain. _____

81. Please provide more detail on your primary reason(s) for seriously considering leaving your POSITION, FIELD, or INSTITUTION? _____

Conceptualization of SFES Positions ...
In this section of the survey, you will be asked questions about your views on the nature of SFES positions – their purpose and value – more generally across the United States.

In responding to these questions, please think beyond your own professional situation and your own SFES position. Please consider your understanding of the SFES phenomenon across the United States more generally.

82. What would you consider to be three most common reasons that a science department hires a Science Faculty with Education Specialty? _____

83. What are the three most valuable contributions that SFES COULD make to a science department? _____

84. What are the three most valuable contributions that YOU as an SFES ACTUALLY make to your science department? _____

85. What three types of formal training experiences - whether they are currently available or not - do you think would best prepare an individual for an SFES position? _____

86. What are the three most important pieces of advice you would offer to a beginning SFES? ? _____

87. Please think beyond your own professional situation and your own SFES position. Based on how you understand SFES across the United States more generally, complete the following sentence:
SFES positions are:
primarily teaching positions.
primarily research positions.
primarily service positions.
both teaching and research positions.
both teaching and service positions.
both service and research positions.
a combination of teaching, service and research positions.
Please provide any comments you would like to share about your responses.

88. Please think beyond your own professional situation and your own SFES position. Based on how you understand SFES across the United States more generally, please choose your level of agreement with the following statements.
The SCHOLARLY ACTIVITIES of SFES involve:

	Strongly agree	Agree	Disagree	Strongly disagree	No basis for judgment
Basic Science Research					
Science Education Research					
K-12 Science Education Activities					
Undergraduate Science Education Activities					

89. Please feel free to make additional comments about what you think the nature, purpose, and value of SFES positions are around the United States in general. _____

This survey is the first phase of our National Study of SFES in the United States. In the next phase we plan to more thoroughly explore the institutional context of SFES in the United States. This section will ask questions anticipating future phases of this project.

For the Future ...
90. Would you be willing to be interviewed about your SFES experiences and your conceptualization of SFES? Yes No

Please note, contact information entered on this page will be removed from your other survey responses. It will not be associated with any other information you have provided and will not be used for analysis.

If you would prefer to provide contact information external to this survey, please send your name, your institution's name, and your email address to csu.sfes.researchteam@gmail.com.

91. Please provide the following contact information.
Name: _____ Institution: _____ Email Address: _____

About You ...
This section will ask demographic questions. As with the rest of the survey, any potentially identifying information in your responses will be kept strictly confidential and the survey data itself will be collected ANONYMOUSLY. We are interested in the set of responses as a whole, not a particular individual's responses.

92. What is your gender? Female Male Decline to state

93. What is your age?
20-29; 30-39; 40-49; 50-59; 60-69; Decline to state

94. With which race(s) do you most closely identify? Please mark all that apply.
American Indian or Alaska Native
Asian
Black or African American
Native Hawaiian or Other Pacific Islander
White
Other
Decline to state

95. With which ethnicity do you most closely identify?
Hispanic or Latino Not Hispanic or Latino Decline to state

Thank You!

Thank you very much for responding to our request to participate in our National Study of Science Faculty with Education Specialties in the United States.

If you would like to receive a copy of the report that is written as a result of this survey, please send your request and email address to csu.sfes.researchteam@gmail.com

If you would like to learn more about our previous SFES research, please visit:
http://www.sfescommunity.org/

IF YOU HAVE COLLEAGUES that you feel should take this survey, please forward them the email invitation you received or use the invitation below.
~~~~~~
~~~~~~

Greetings Colleague,
You have received this email because you may be a Science Faculty with an Education Specialty (SFES) or work with an SFES. As a research team of SFES ourselves, we conducted a study of SFES in the California State University system and published findings in Science magazine and CBE–Life Sciences Education. To better characterize SFES, we are expanding the scope of our study to the national level in the United States and would like to hear from you.

While all college and university science faculty are education specialists in some regard, we define SFES here as individuals who either: 1) have been specifically hired in science departments to specialize in science education, OR 2) have transitioned to a role as a science faculty member focused on issues in science education after their initial hire. This study continues to characterize SFES and their diverse roles in science education.

If you are an SFES or think you might be an SFES, we would very much appreciate your participation in a national survey of SFES across the U.S. at the link below:
http://www.surveymonkey.com/s/UnitedStatesSFES Your voluntary participation in this study would:

1) consist of answering questions in an on-line survey by APRIL 25, 2011.
2) be anonymous and voluntary.
3) require about 45 minutes of your time.
4) invite you to forward this email to colleagues in the U.S. who might be SFES.

You may find the survey enhances your awareness of one or more issues that impact your professional success. Reported findings may include information that could enhance your own career, as well as the fields of higher education and science education.

Please let us know you are out there and complete this survey today!

Thank you in advance for your time and willingness to participate in this research. Sincerely,

Seth Bush, California Polytechnic State University, San Luis Obispo
Nancy Pelaez, Purdue University
James Rudd, California State University, Los Angeles
Michael Stevens, Utah Valley University
Kimberly Tanner, San Francisco State University
Kathy Williams, San Diego State University

Please note: We will NOT share your information with third parties. If you feel you received this email in error and would prefer not to be included in future mailings, please send an email to: not.sfes@gmail.com.