



A Successful Mentoring Approach for Encouraging New NSF Proposal Submissions from Community Colleges

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Kathleen Alfano has a Ph.D. from UCLA in Higher Education with a cognate in administration and evaluation. Her B.S. is in chemistry and she worked as an analytical chemist in industry before pursuing a career in education. She served as founder and Director of the California Consortium for Engineering Advances in Technological Education (CREATE) based at College of the Canyons from 1996 to 2016. Retired from College of the Canyons in November 2016, she is an Emeritus Professor and also former Dean of Professional Programs and Academic Computing. She currently acts as co-PI for the CREATE NSF ATE Renewable Energy Support Center and as PI of a NSF ATE grant writing workshop project and co-PI of two ATE projects in energy storage and SCADA. Dr. Alfano served as a Program Director at the National Science Foundation and co-lead of the ATE program in 2007-2008. Dr Alfano also was the only community college representative on the National Academy of Sciences Committee on Workforce Trends in the U.S. Energy and Mining Industries which released their report in March 2013.

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Overview:

The key outcome of this project is an increase in the number of competitive National Science foundation (NSF) ATE (Advanced Technological Education) proposals submitted by community college (2YC) faculty through a model incorporating a three-day mentoring workshop and continued mentor support throughout the proposal development, writing, proposal submission and negotiation. The project proposal writing component and 2-year mentoring by experienced principal investigators increase the knowledge and skills of 2YC STEM faculty at institutions with minimal grant activity, thereby strengthening the personal and institutional ability to pursue other proposal based projects. Participants learn strategies for institutional investment in pursuit of NSF program grant funding and increase project team expertise through a series of post-workshop webinars.

The project seeks to increase the diversity of the NSF ATE application pool in multiple ways including geographically, outreach to majority minority and lower economic communities, and to increase gender equity in the technician education community. The project team seeks to imbue lessons learned from the previous three workshops and mentoring programs to increase the success of each cohort. The team provides support to mentee faculty for up to two years in an effort to give them the best chance to submit a successful proposal. In the 2019 ATE submission, 12 of 14 colleges submitted proposals plus several submitted from the previous year's mentees. In 2018 ATE submission, 18 proposals from our mentoring group were submitted, 14 from the summer 2018 cohort and 4 more from the summer 2017 cohort. It is hoped that through this project and the model it is continuing to hone the NSF ATE program will experience growth in 2YC participation and workshop participants will serve as change agents for their institutions with the innovative ideas and teaching pedagogies developed in their mentored projects. For 2YCs awarded ATE grants, this project will result in improved student access to education and acquisition of skills needed to enter the workforce as STEM graduates whose contributions will advance the nation's economic goals for meeting emerging workforce needs.

Overall project goal:

There are two overall goals of the ATE-2YC project:

1. To broaden knowledge of, build capacity, and increase access to the NSF ATE program among all community colleges across the U.S. with ATE-allowed 2YC programs in fields supported by the ATE program including, but not limited to, advanced manufacturing technologies, agricultural and bio-technologies, energy and environmental technologies, engineering technologies, information technologies, micro- and nano-technologies,

security technologies, geospatial technologies.

2. To increase the number of competitive proposals in the ATE program submitted by faculty at 2YCs.

Workshop format

The PI and grant staff hosted 2.5-day workshops with mentoring in Ohio in August 2017 and June 2018 and in California July 2019 and (upcoming) June 2020. (Note: Due to the COVID19 outbreak, the June 15-17, 2020 workshop has been changed to a virtual workshop using zoom and other on-line tools. Mentors will still be assigned and work with college teams each week).

The workshop training has focused on writing ATE proposals. All of the mentors assigned have served as either NSF Program Directors and/or Mentor Connect or Mentor Links mentors, so they have knowledge of NSF programs and experience in helping ensure high-quality grant proposals.

Two participating faculty per college are provided with a stipend for travel expenses, lodging, and meals. Two additional stipends were provided to each of the two faculty who completed the workshop and submitted a proposal to the NSF within the allotted timeframe. A grant writer was allowed to participate as a third member of each team as long as they were supported by their college.

The agenda was as follows in 2018-2019:

2019 National Science Foundation (NSF) Sponsored Grant Writing Workshop Agenda July 14-17, 2019

Day 0

Sunday, July 14, 2019 – Optional Dinner

5:40PM Meet in hotel lobby for short walk to location

6-8PM Introduction of Mentors and Leadership Team (one minute each)

Note: Mentor/co-PI/PI bios will be in participant folders (will be passed out Monday morning)

Dinner Meeting with mentor

Mentors and teams discuss pre-workshop assignments

Goal – mentors help teams adjust project ideas to fit what ATE will support

Day 0 Evening Assignment: Each college should appoint a spokesperson and prepare a one minute introduction of your team and your project for tomorrow morning.

Day 1

Monday, July 15, 2019

6:30-8:00AM Breakfast at hotel

8:15 -8:30AM Bus pickup at hotel

9:00 – 9:10AM Welcome

9:10 – 9:30AM Introduction of Colleges

9:30-10:00 Session 1: ATE Basics (brief session 30 minutes including Q&A)

Components of ATE proposal

Head's up about submission process, Fastlane, grants.gov, research.gov

What PIs and grants offices will have to do between now and submission

day

10:00-10:45AM Session 2: Rationale (45 minutes)

Brief presentation on importance of rationale (10 minutes)

Hands on: PIs and Mentors review rationale outlines teams have prepared
make improvements as needed.

10:45 – 11:00AM Break

11:00-12:00PM Session 3: Goals, Objectives, Deliverables (60 minutes)

Brief presentation what are goals, objectives and deliverables (10-15
minutes)

Hands on: PIs draft goals and objectives

Mentors review

Teams swap objectives and critique each other

12:00 – 1:00PM Day 1 Lunch – Buffet Style

1:00 – 1:45PM Session 4: Activities to Accomplish Goals and Objectives (45
minutes) Teles

Brief presentation types of activities typical for ATE (10-15 minutes)

Hands on: PIs create outline list of goals and objects

Mentors review

1:45-2:00PM Break

2:00 – 2:45PM Session 5: Timetable (45 minutes)

Brief Presentation what is needed for time table? (10 minutes)

Hands on: PIs create draft timetable

Mentors review

2:45-3:00PM Break

3:00 – 3:45PM Session 6: Management plan (45 minutes)

Brief Presentation what goes in the management plan? (10 minutes)

Hands on: Drafting a management plan

Mentors review

3:45-4:00PM Break

4:00 – 4:45PM Session 7: Budget 1 (45 minutes)

Presentation – the budget, what's allowed, do's and don't

Indirect Rate (IDR) and the impact on budget

Q&A about budget

5:00 – 6:00PM Session 7A: (30-60 minutes)

Day 1 Dinner – Buffet Style

Explanation of Mock Panel

Impacts? Explain Review Criteria - What are Intellectual Merit and Broader

Criteria - What are Intellectual Merit and Broader Impacts?

Distribute redacted proposals as faculty leave dinner

6:00PM Bus takes participants back to hotel

Day 1 Evening

PIs read and review redacted proposals

Day 2

Tuesday, July 16, 2019

6:00-8:00AM Breakfast at hotel

8:15 -8:30AM Bus pickup at Comfort Suites

9:00 – 10:15AM Session 8: The 1-page summary (75 minutes)

Brief presentation: preparing the Overview, Intellectual Merit, Broader

Impacts

Hands on: Team create outline of 1-page summary

Share and mentors review

10:15-10:30AM Break

10:30-11:00AM Session 9: Evaluation plan (30 minutes)

Brief presentation: what you need to know about evaluation

11:00-11:15AM Break

11:15 – 12:00PM Session 10: Sustainability and Dissemination plan (45 minutes) Walz

Brief presentation: what is meant by sustainability?

Creating as detailed and specific dissemination plan (15 minutes)

Hands on: Teams outline plans

12:00 – 1:00PM Lunch

1:00-3:00PM Session 12: Mock Panels (50 min each plus break in between) Weeks

Panels meet and review proposals

Panels review 2 proposals, break, and report out on mock panel results

Look on the back of your nametag to see what color dot is your group

3:00-3:15PM Break

3:15 – 4:00PM Fastlane and ATE Central, Mentor Connect (45 minutes) Wosczyzna-Birch

4:00-5:00PM Session 12A: Mentor meetings (60 min)

Teams meet with mentors to discuss accumulated questions and resolve issues.

Mentors help teams with elevator speeches and project summaries

5:00 – 6:00PM Dinner- Buffet Style

Dinner activity: Continue discussions with Mentors

6:00PM Bus takes participants back to hotel

Day 2 Evening

Teams prepare elevator speeches

Team write draft 1-page summary (Overview, Intellectual Merit, Broader Impacts)
Feedback from mentors

Day 3

Wednesday, July 17, 2019

6:00 – 7:30AM Breakfast at hotel

7:30 – 8:00AM Breakfast Meeting with your team (at hotel/or at College)
Teams and mentors review elevator speeches

8:15 -8:30AM Bus pickup at Comfort Suites

9:00 – 10:30AM Session 13: Elevator Speeches (90 minutes)
Elevator speech (1 slide – 2 minutes)
Feedback and questions from everyone
(plan on 7 minutes per team)

10:30-10:45AM Break

10:45 – 11:00AM Session 14: Timelines for completion now until ATE deadline (15 minutes)

11:00 – 11:45AM Session 15: What is an IRB?

Explain IRB. What it is, when you will need it? (10 minutes)

Upcoming support/Webinar announcements (20 minutes)

Post Workshop Webinars:

Other required forms

Current and Pending

Biosketch

Conflict of Interest

Data Management Plan

Facilities, Equipment, and Resources (FER)

Commitment Letters

Evaluation

Budget

Other/Questions?

Post workshop On-line Evaluation Survey (15 minutes)

Please do on your laptop. A link will be posted in the room. No reimbursements can be paid until the final evaluation is completed. Thank you!

12:00 End of Workshop

Comprehensive workshops were delivered to community college (2YC) faculty as described above to improve their ability to develop and submit competitive ATE grant proposals. Faculty professional development continued after the workshop through mentoring and continued support of faculty efforts to develop their proposals.

Participant surveys were administered evaluating the workshop conducted in June 2018 and in June 2019. An analysis of participant responses to online surveys—one

administered immediately after the workshop and another administered after the deadline for participants to submit their ATE grant proposals—helped to produce a picture of in-process factors, initial outcomes, and overall effects of the project thus far. Results of the workshop evaluation survey are presented below.

The 2.5-day workshop in Ohio in June 2018 was attended by 42 two-year institution faculty and administrator/staff participants. Participants represented twenty-six schools from a wide geographic distribution (every area of the country was represented) and diverse settings, which included remote rural settings, small towns, large and small suburban areas, and urban centers from small to large. Forty-eight percent (48%) of the workshop participants were female. Participating faculty represented nine different disciplinary and technical education areas: Information Technology/Computer Science, Chemistry, Water Technology, Physics, Math, Engineering, Physical Science, Astronomy, and Electrical Power Technology.

Project participants were assigned a mentor who provided guidance and assistance in the preparation of ATE proposals. The PI, Co-PI, and the workshop leaders served as mentors for the project. Mentoring began during the workshop sessions and continued up to the point of grant submission. A series of post-workshop milestones were established to direct mentors and participants toward their goal of grant submission. The project used email, telephone, and three webinars as below to keep in communication following the workshops.

Post-Workshop Webinars

The webinars were provided after the workshop. They were a series of live-streamed events during which mentors provided information about specific grant writing topics and participants had the opportunity to ask questions about these topics as they were preparing their proposals. The webinar grant-writing topics were:

- Fastlane, Forms, and Timetable
- Evaluation— (ATE Evaluator) (Those faculty with additional evaluation questions were encouraged to attend the EVALUATE webinar the next week.)
- Evaluation in ATE proposals, EVALUATE regularly scheduled webinar
- Budget and final review and checklist—

Participant and Institutional Demographics

Six of twenty-six schools (23%) had a student body in which traditionally underrepresented students were the majority of the student population (e.g., less than fifty percent 50% of the student population was white). Six more of the twenty-six schools (23%) had study bodies in which traditionally underrepresented students made up between 30% and 45% of the student population. Female students make up more than

fifty percent (50%) of the student body in twenty-two of twenty-six schools (85%) represented at the workshop. The gender statistics reflect the gender breakdown at 2-year colleges generally.

2018 Workshop evaluation

A Post-Workshop survey was developed using the workshop survey instrument created for the prior PSE-2YC project and was administered immediately after the workshop to collect faculty feedback on four different aspects of the workshop: Participant Background and Attitude, Pre-workshop Preparation, Workshop Content (materials, presentations and other activities), and Workshop Outcomes. Participants were asked to rate (from 1 to 5) various aspects of the workshop. The specific descriptive ratings that correspond to the numeric ratings for each question are shown in the table.

Participants rated the workshop, materials, and workshop leaders highly (average scores ranged from 4.68 to 5.00). On average, participants had moderate interest in writing an NSF grant proposal (average score of 3.44) but low confidence to write a proposal prior to the workshop (average score of 2.46). After the workshop, workshop outcomes were also rated highly—participants indicated that their confidence and motivation to write an ATE grant proposal was greatly increased (average scores of 4.43 and 4.65 respectively), and their willingness to share grant-writing knowledge was greatly increased (average score was 4.68). Participants rated the knowledge and responsiveness of workshop leaders highly (average scores of 5.0 and 4.90 respectively) and the organization of the workshop and usefulness of the materials highly (average scores of 4.73 and 4.68 respectively).

The overall tone of participants' comments was positive and enthusiastic and the topics that generated positive and enthusiastic responses were about the learning, organization, and effectiveness of the workshop in helping them gain confidence and motivation in writing a grant proposal. Many participants indicated that their time with mentors was the most helpful component of the workshop. Other participants cited the opportunity to read and review proposal examples, writing the pre-proposal, and the introductory presentations.

Participants made positive comments about the helpfulness of the workshop as well as the confidence participants gained by attending. Other comments included positive appraisals of the workshop organization, the knowledge and approachability of the presenters, and the large amount of useful information given.

Formative feedback regarding improving the workshop was also gathered from participants and these results were shared with the project team. When asked if they could add or enhance one topic the most frequently mentioned area to enhance was to add more examples of funded and unfunded proposals. Other topics for enhancement included more time to network with colleagues, and more time to work on the proposal. Participants also requested more information about grant evaluation, preparing the grant budget, and how to limit the scope of the proposal or focus the proposal.

Mentoring evaluation

A follow-up survey of participants' mentoring experience was administered near the NSF deadline for the ATE proposals. The survey consisted of open-ended questions and inquired about participants' experiences and barriers encountered as they continued to develop and submit their proposals.

All of those who responded to the follow-up survey reported positive interactions with and helpful feedback from their mentors during the workshop experience, and all but one indicated that they received helpful feedback from their mentors post-workshop. More specifically, comments made by participants were about how helpful, knowledgeable, and informative their mentors were. Even though not every participant team submitted a proposal, their comments indicated that it was due to conditions or events that were out of their control and was not a result of a lack of support from their mentors.

Participants were asked about their mentoring experience after the workshop in preparing their proposals. Seventeen participants responded (N=17). Respondents indicated that their mentors were very knowledgeable and provided feedback, answered questions that arose during proposal preparation, reviewed proposal drafts, and provided encouragement. The most frequently mentioned aspects were the guidance given by their mentors, receiving mentor feedback on their proposals, and responsiveness and helpfulness of their mentors. However, when asked for other comments about the post-workshop mentoring or the proposal preparation in general, all but one respondent commented on the helpfulness of the workshops, mentoring, and the webinars. One respondent indicated that there was a disconnect between the post-workshop mentoring and the participant's needs.

When asked about the most helpful elements of the mentoring process participants indicated the mentors' knowledge of the details of their proposals, mentor availability for answering questions, guidance on focusing and clarifying the proposals, helping the participants think through ideas, and reviewing and helping to edit the proposals.

When asked for other comments about the post-workshop mentoring or the proposal preparation in general, one respondent indicated that the workshop was too much information too fast and thought that pre-workshop reading assignments would have helped.

Proposal submissions and success rates

The ATE-2YC grant project resulted in fourteen grant proposal submissions from the 2018 cohort (56%) and four submissions from the 2017 cohort. Eleven proposals from the 2017 and 2018 cohorts have been funded and six out of the twelve 2019 cohort of college submissions have received negotiation questions, with three in the small new projects and three in the large project/instrumentation acquisition categories.

Barriers to submission

Participants who were unable to submit an ATE proposal were asked about barriers to the development and submission of their proposals. Their responses (N=9) included the following: realization of the unfeasibility of the program proposed, lack of administrative support, time constraints due to faculty teaching load, political barriers at the institution, and problems with the grant project personnel. All of those who were unable to submit a proposal were asked if there was anything the grant team could have done differently to help. Nine participants responded, and all of those who responded to this question indicated that the barriers were internal to the institution or otherwise out of control of the ATE grant team.

Barriers to submission were largely internal to the institutions and reflect the effects of lack of administrative understanding or support. However, other barriers included a couple of proposal teams that decided not to submit their proposals due to problems with the proposed program or a lack of fit between the proposed program and the grant team/institution. For instance, one of these respondents indicated that as they moved forward with the proposal “it became very obvious that the numbers (of participant recruits) could not support nor justify a large monetary award.”

Additional insights into the 2019 cohort mentoring and workshop experience

The National Science Foundation Sponsored Grant Writing Workshop of July 14-17, 2019, was designed to improve the confidence and grant writing abilities of prospective writing teams as they competed for Advanced Technology Education Program grants. Prior to participating in the workshop, the participants were sent a survey asking questions and this survey was repeated following the workshop. Background information was gathered. Sixteen of the twenty-nine participants stated that they had written and submitted an NSF grant proposal in the past. Eleven of them had been successful.

The group was asked a series of questions regarding their confidence levels on several aspects of the grant preparation process.

	Participants reporting 4 or 5 (5 being the highest) before the workshop (25 responses)	Participants reporting 4 or 5 (5 being the highest) after the workshop (29 responses)
I feel confident in managing the NSF submission process (Fastlane, grants.gov, research.gov)	40%	93%
I feel confident understanding the tasks that need to be accomplished	40%	96.5%

prior to submission day.		
I feel confident in my ability to write a quality rationale for a proposal.	40%	93%
I feel confident in my ability to write goals, objectives and deliverables for a successful proposal.	56%	96.5%
I feel confident in my ability to outline the activities to accomplish the goals and objectives.	60%	93%
I feel confident in my ability to write a time table for a successful proposal (with appropriate formatting, etc).	36%	86%
I feel confident in my ability to write a management plan for a successful proposal.	36%	86%
I feel confident in my ability to write a complete and correct budget for a successful proposal.	40%	76%
I feel confident in my understanding of indirect rates and their impact on the budget in a successful proposal.	32%	86%
I feel confident that I understand what reviewers are looking for in assessing the intellectual merit of a proposal.	20%	93%
I feel confident that I understand what reviewers are looking for in assessing the broader impacts of a proposal.	28%	93%
I feel confident that I can prepare a successful overview for a proposal.	48%	96.5%
I feel confident that I understand what is needed for sustainability and dissemination in a successful proposal	37.5%	93%

I feel confident that I understand what is required in terms of IRB (Institutional Research Board) approval for a successful proposal.	16%	14%
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On questions asked only on the post-survey, 76% felt the level of knowledge of the workshop leaders was exceptional; 79% felt that workshop leaders were highly responsive to their needs; 69% found the handouts and other materials to be very high in usefulness; 62% found the workshop to be very highly organized with another 20 stating it was highly organized.

Summary and Conclusions

The evaluator states that all measures show increased confidence among all the participants in their knowledge and skills to prepare and submit a grant proposal. The leadership team had a quality structure thought through but was willing to adapt to participants' needs.

The last two years of the NSF grant writing model has proven successful in assisting both experienced and inexperienced colleges with achieving a larger or first NSF ATE grant. NSF feedback indicates that mentored projects (both from Mentor Connect and ATE2YC/Mentor Up) are achieving better success in receiving funding than non-mentored projects. The project team remains committed to continuous project evaluation and quality control and the model evolves with feedback. Upcoming innovations expected in 2020 include a revised agenda with more small group activities at the workshop and less seat time and a second summer workshop focused on mentoring cybersecurity and IT proposals. Also, as noted, due to the COVID19 outbreak, the June 15-17, 2020 workshop has been changed to a virtual workshop using zoom and other on-line tools. Mentors will still be assigned and work with college teams each week. This will also give the leadership team and the evaluator comparison data on two very different delivery modes which will enhance the revision of the model in the future.