Application: Christiane Spitzmueller

Christiane Spitzmueller - cspitzmu@central.uh.edu
2019: Safer Offshore Energy Systems Grants 4

Summary

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Last submitted: May 1 2019 07:40 PM (UTC)

SOES4: Progress Reporting: Final Report

Completed - Feb 1 2023

Within 60 days of completion of the all grant activities, the Grantee shall provide in writing a Final Grant Report. The Final Grant Report shall address the original objectives of the project as identified in the Grant Proposal as a attachment in the Grant Agreement, describe any changes in objectives, describe the final project accomplishments and include a final project accounting of all grant funds.

Help us promote your efforts and accomplishments by providing images that represent and illustrate the work of your project. **Please provide at least one image.**

When providing images, please be aware that image ownership must be known and indicated to ensure proper usage rights can be been granted. Generally, images created for the purposes of carrying out or documenting the work of a grant project are owned by the institution that is the recipient of the grant, whereas images created for personal use or documentation are owned by the individual creating them. However, please consult with your institution to confirm image ownership if there is any uncertainty for your particular situation. There are different forms and usage rights to be granted for institution-owned images versus personally-owned images. Please upload institution-owned images and personally-owned images separately using the two sections below.

SOES4: Progress Reporting: Final Report

1. Goals and Accomplishments

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PROJECT INFORMATION

Project Director's Name*	Peggy Lindner
Organization*	University of Houston
Project Title*	Employee Well-Being and Mindfulness as Predictors of Process and Personal Safety
Reporting Period*	Final

Note to Grantees: In sections 1 to 5, we ask you to highlight your accomplishments (including outputs and outcomes) through this grant award. These sections of the final grant report will be made available to the public.

1. GOALS AND ACCOMPLISHMENTS

1.1 Please restate the goals and objectives of your project.*

The major project goals and research objectives are to expand safety culture research by establishing modified mindfulness exercises as well-being and safety culture tools for offshore workers. Integrating mindfulness as a key, highly trainable skill into safety culture models for the Gulf of Mexico (GOM) is likely to result in significant broadening of our understanding of malleable components of safety culture.

Our specific objectives are as follows:

(1) Develop a theoretical framework to examine how mindfulness relates to safety culture, with a specific focus on perceptions of supervisory safety culture, worker situational awareness, employee burnout and well-being as well as specific safety behaviors (participation and compliance).
(2) Develop and deploy baseline and post-intervention surveys as well as experience sampling method (ESM) tools to capture mindfulness intervention effectiveness.
(3) Create, pilot test and implement offshore-compatible mindfulness exercises that will enhance employee situational awareness and mindfulness, reduce employee burnout, enhance worker well-being and workers' psychological detachment from work during off-hours, and increase employee safety behaviors (both compliance and participation).
(4) Develop and disseminate fine-tuned versions of the mindfulness offshore exercises based on effectiveness data on the relationship between mindfulness and offshore worker outcomes and explore relationships with process safety outcomes.

1.2 Describe the accomplishments of your project. You should include both the anticipated accomplishments that you outlined in your project proposal as well as any *unanticipated* accomplishments that have since occurred. Describe any activities you have conducted, programmatic progress made, or project benchmarks and milestones met.*

We developed key deliverables as described in our initial funding application, along with supplemental products that resulted from short-term project changes due to COVID-19. For further dissemination of results, we created an industry-facing study website: https://uh.edu/uh-energy/research/nasem/. This website serves as a resource to researchers and safety professionals interested in utilizing mindfulness-based activities to improve offshore safety and provides study materials and progress overview, as well as links to key publications and white papers produced by our team.

(1) In year one, we completed functional job analyses technical reports for six offshore positions across our two partner companies (Diamond Offshore Drilling, Inc. and Baker Hughes). The purpose of these functional job analyses is to determine tasks with inherent safety risks. These job analyses will inform the implementation of our mindfulness programs, with the goal of increasing employee capacity to complete high-risk tasks while staying focused, alert, and undistracted throughout task completion. The reports resulting from these job safety analyses can be downloaded at: https://uh.edu/uh-energy/research/nasem/job-analysis.php

(2) Next, in advancing and integrating existing literature on safety and mindfulness, we conducted a meta- analysis and meta-review of prior research. The journal article developed is currently in revise and resubmit status at Journal of Organizational Behavior, with Zihan Liu, a graduate student funded by our project, serving as first author. To advance the dissemination of findings, we created a safety practitioner-oriented resource that is available through our project website: https://uh.edu/uh-energy/research/nasem/research-mindfulness.php

(3) Next, we developed survey instruments for daily surveys and baseline surveys, obtaining feedback from our partner organizations. Our mindfulness interventions were developed by our clinical psychologist team members, and pilot tested at Baker Hughes and Diamond Offshore Drilling. After pilot testing and adjusting the interventions, they were implemented, along with baseline measures and daily surveys, through a train the trainer model by Baker Hughes and Diamond Offshore employees.

(4) Data collection was completed in August 2021, and our team has been processing and analyzing the data generated. A summary report of the methodology and approach was delivered to NASEM, and results were shared with our industry partners. A research paper describing methods and results in detail has been developed and will be submitted to the Journal of Occupational Health Psychology.

(5) Our industry partners widely disseminated results of our findings, and have leveraged our intervention beyond

the initially specified offshore population. The program has been successful and Baker Hughes has received the Center for Offshore Safety's Safety Leadership Award for our industry-academia partnership on this project.

(6) In Spring of 2022, we organized the “Offshore Mindfulness Health and Safety Conference” hosted at the University of Houston to share our findings with 30-50 industry stakeholders and offshore safety researchers.

(7) To increase the impact of our dissemination activities, we have produced a couple of videos that can be accessed on our project website. The first video provides an overview of our project and findings. In addition, four animated videos have been produced that can be used by companies interested in implementing mindfulness interventions at their offshore facilities. The website also provides industry-oriented one-pagers.

(7) Due to delays in collecting job safety task analysis data during the beginning of COVID-19, we used the time to pilot test some of our survey items as part of broad industry surveys geared towards capturing the state of the energy workforce during COVID-19. In addition to providing preliminary validity data for our safety culture and mindfulness/situation awareness measures, we were able to contribute to industry discourse on offshore safety and energy worker health and well-being during COVID-19. This effort resulted in two white papers, and a publication in Journal of Occupational and Environmental Medicine. The first author on the JOEM paper is a graduate student funded through the grant (https://doi.org/10.1097/JOM.0000000000002012). The link to the two white papers can be found here: https://uh.edu/uh-energy/research/white-papers/.

2. Outputs

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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2. OUTPUTS

Outputs are tangible or measurable deliverables, products, data, or publications produced during the project period.

2.1. Please indicate the number of students (K-12, undergraduate, or graduate), postdoctoral scholars, citizen scientists, or other trainees involved in the project. *

Please enter 0 if none were involved.

K-12 students	0
Undergraduate students	2
Graduate students	6
Postdoctoral scholars	2
Citizen Scientists	0
Other Trainees	0

2.2. Has your project generated any data and/or information products? *

Generation of data includes transformations of existing data sets and generation of data from existing resources (e.g., maps and images). Information products include publications, models, software, code, curricula, and digital resources.

(Check all that apply.)

Responses Selected:

Information Products

2.3. Briefly describe how you fulfilled the approved Data Management Plan and, if applicable, any changes from the approved plan. *

We have been able to fulfill the approved Data Management Plan through utilization of the UH Sharepoint infrastructure while conducting the study as well as collecting archival data from the project partners. All data and meta-data is still accessible for UH and project team members.
As stated in the original Data Management plan, we plan to release aggregated study data and metadata following publication of results or one year following the conclusion of the project, whichever occurs first.

If your project has produced publications, websites or data portals, GIS applications, models or simulations, software packages or digital tools, code, curricula, or other interactive media, please download the Excel worksheet entitled GRP Information Management Reporting. Use the "Information Products Report" tab in the worksheet to create an inventory of these products and to verify deposit in a curation facility. Upon completion, please upload the worksheet to your task list. If you need guidance on how to complete the Information Products Report, please e-mail gulfgrants@nas.edu. A member of GRP's data management staff will reach out to you.

2.4. Aside from data and information products, what other tangible or measurable deliverables or products (e.g., workshops, trainings, and outreach events) were produced during the project period? *

Upon completion of this form, you may upload supplemental material that represent the tangible or measurable deliverables or products to complement this narrative report.

In Spring of 2022, we organized the "Offshore Mindfulness Health and Safety Conference" hosted at the University of Houston to share our findings with 30-50 industry stakeholders and offshore safety researchers.

The project team hosted a webinar "Dissemination of Mindfulness-Based Training Programs in the Oil & Gas Industry" on Wednesday, May 19th, 2021. The purpose of this webinar was to introduce mindfulness training as a helpful tool in the oil and gas industry to promote safety among offshore workers. Invitees included industrial/organization researchers, safety scientists, and energy industry leaders. Results from discussions and breakout sessions have been included in the one-pagers that are accessible on the project website.

4. Information Products

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4. INFORMATION PRODUCTS

In this section, please provide a response to each question to complement the **Information Products Report** in the **GRP Information Products Management** Excel worksheet.

4.1. Please select the type(s) of information products that your project produced. *

Responses Selected:

1. Scholarly publications, reports or monographs, workshop summaries, or conference proceedings
2. Websites or data portals

Scholarly publications, reports or monographs, workshop summaries, or conference proceedings *

Please provide a list of citations for project publication, reports and monographs, workshop summaries, and conference proceedings.

Publications and presentations:

Liu, Z., Baranski, E., Snyder, G., Hoff, K., Flin, R.H., Spitzmueller, C., & Lindner, P. (2023) Mindfulness and Workplace Safety: A Meta-Analysis and Qualitative Review. Journal of Organizational Behavior. Manuscript submitted for publication.

Schoolfield, L., Smit, T., Spitzmueller, C., Flin R., Derrick J., Lindner P., and Edema-Sillo E. (2023) Brief Mindfulness Interventions in Unconventional Safety-Critical Occupations, Journal of Occupational Health Psychology, Manuscript in preparation.

Van Egdom, D., Spitzmueller, C., Wen, X., Kazmi M., Baranski E., Flin, R. and Krishnamoorti R. Job Insecurity during an Economic Crisis: the Psychological Consequences of Widespread Corporate Cost-Cutting Announcements. Occup Health Sci 6, 1–25 (2022). https://doi.org/10.1007

Dumlao, S. V. (Chair), Payne, S. C., Spitzmueller, C., & Tannenbaum, S. I. (2022). I-O Psychology in the Gulf: Safety Culture of Offshore Workers [Panel]. Society for Industrial and Organizational Psychology Annual Conference, Seattle, WA, United States.

Liu, Z., Baranski, E., Snyder, G., Hoff, K., Flin, R.H., Babalola, O., & Jeff-Eke, E. (2021) A Meta-Analytic Review of Trait Mindfulness and Workplace Safety. Poster Presentation at 36th Annual SIOP Conference, New Orleans, LA, USA.

Liu Z, Van Egdom D, Flin R, Spitzmueller C, Adepoju O, Krishnamoorti R. I Don't Want to Go Back: Examining the Return to Physical Workspaces During COVID-19. J Occup Environ Med. 2020 Nov;62(11):953-958. doi: 10.1097/JOM.0000000000002012. PMID: 32858556.

UH Energy. 2020. Mindfulness and Workplace Safety: Implications for Offshore Drilling and Operations in the Gulf of Mexico [White paper]. https://uh.edu/uh-energy/research/white-papers/

UH Energy. 2020. The Energy Workforce and Covid-19: Data-Driven Policy Recommendations. [White paper]. https://uh.edu/uh-energy/research/white-papers/white-papers-files/krishnamoorti-energy-outlook-covid-19.pdf

Websites or data portals *

Please provide a list of project websites and data portals (including the website URL).

The website for the "Offshore Mindfulness and Safety Initiative" can be found at: https://uh.edu/uh-energy/research/nasem/

How long beyond the grant period will you maintain the project website/data portal and its contents? Please describe plans to archive the website/data portal and its contents after regular maintenance concludes.*

Our relationship with UH Energy and access to their administrative services will enable us to maintain the project website indefinitely.
All information contained on the website has already been archived in the project Sharepoint site and file storage.

4.2. Beyond depositing information products in a repository, what other activities have you undertaken or will undertake to ensure that others (e.g., researchers, decision makers, and the public) can easily discover and access the listed information products? *

Beyond depositing information on our study's website, we have pursued dissemination of our project's products to the public using three pathways:
Industry partners: In order for this project to significantly improve safety culture in the GOM, we have worked on a plan for broad results dissemination through the established partnerships with our partner companies. We will jointly develop presentation materials for presentation at industry conferences where we have previously presented our work (including but not limited to IADC conferences, SPE events, OTC). All study participants will receive a report of study findings and implications through their employer.
Future workforce training: In collaboration with UH Energy, we will provide University of Houston petroleum engineering students with a training session during year two of the grant. This will bring our "Time 2 Re-focus" training to the next generation of energy workers. UH engineering students are among the most diverse engineering students in the country and enter the energy industry at high rates.
Offshore & General Safety Science: We will publish results in peer-reviewed journals dedicated to offshore safety, workplace safety and occupational health psychology (such as Accident Analysis and Prevention, Safety Science, Journal of Occupational Health Psychology). We will share findings at workplace safety conferences and at international meetings for I/O Psychologists and industry conferences (i.e., SPE).

The current project director, Dr. Peggy Lindner will ensure that the website stays accessible (it is hosted at the main University of Houston webserver, which receives system updates through UH IT). The contact information on the website will be updated to ensure interested stakeholders can reach out to the project team.

4.3. Are any of the information products you produced confidential, proprietary, or subject to special license agreements? *

No

5. Project Outcomes

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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5. PROJECT OUTCOMES

Outcomes refer to the **impact(s), consequence(s), result(s), or effect(s)** that occur from carrying out the activities or outputs of the project. Outcomes may be environmental, behavioral, health-related, or programmatic. Example outcomes include, but are not limited to: increased learning, knowledge, skills, and motivation; policy changes; actions taken by a group as a result of information generated by your project.

5.1. Please describe the outcomes achieved during your project and how they were assessed. For this question, we are interested in learning about the immediate short-term outcomes that have already occurred during or as a result of your project. Do not include long-term outcomes you foresee your work contributing to beyond the end of the project. *

We designed and modified the mindfulness training techniques in partnership with industry partners. Reliance on knowledge from both mindfulness researchers and offshore practitioners and the active engagement of people who have offshore working experience will improve our mindfulness training to be more practically feasible in delivery and implementation and maximize its effectiveness in promoting offshore safety.

Energy companies and offshore workers can use our Time to Refocus interventions as an additional component of their well-being and safety tool kits, contributing a low-cost, easily implementable intervention.

The white paper synthesizing previous research on the mindfulness-safety link is an industry-oriented summary of mindfulness and workplace safety. Published via UH Energy, it will inform industry practitioners of benefits of mindfulness training as a cost-effective safety approach.

5.2. We're interested in hearing not just the results of your project but what are their implications for or contributions to:

- **offshore energy system safety,**
- **environmental protection and stewardship, and/or**
- **health and community resilience**

Please describe what you consider to be the most remarkable accomplishment or finding of your project. What can others learn from your accomplishment and finding? How do you see it fitting in with your greater field of study or community of practice? *

The benefits of mindfulness training are stable and robust across different safety outcomes and various occupations. Based on a systematic review of empirical research on mindfulness as an individual difference and mindfulness as an intervention program, we found that mindfulness is very consistently positively related to workplace safety for various populations such as healthcare professionals and military personnel, which provide exciting evidence for the further application of mindfulness training in offshore settings.

6. Communication

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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Note to Grantees: In Section 6, we seek input from you to help us evaluate the Gulf Research Program's funding strategy. This section will not be made available to the public.

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6. Information to Inform GRP Evaluations

6.1. Sharing the difficulties you encountered helps us learn from your experience. Describe any challenges you encountered in your project and how you addressed or overcame them. Challenges are inherent to conducting any complex project. These may include (but are not limited to): unexpected staffing changes, changes in the community you are working in, appearance of a new technology or dataset in the field you are working in, challenges accessing a field site, policy or regulatory changes that affect the issue you are addressing, low recruitment rates, delays in setting up services, or other problems in implementing and conducting your project. *

The unanticipated challenges (outlined below) have required a high level of flexibility and nimble adjustments to study design and methodology to ascertain success. To ensure our close partnership with our partner companies was successful even in the absence of in-person meetings, we created continuous update documents and led bi-weekly meetings with each partner company to ensure continued progress.
COVID 19 (and the low price of oil during a portion of our project) significantly reduced the number of active drill rigs in the Gulf of Mexico, which has affected our sample size. We were still able to achieve the desired levels of statistical power, but our ability to examine moderators (e.g race, gender, experience, position) has been more limited than we would have liked or expected. Our data collection also took longer, and we were not able to directly deliver our training to offshore personnel. Instead, we opted to have our partner companies' employees deliver the training and roll out our data collection.

6.2. We like to hear about what you learned from your work and how you feel it affects future work or the work of others. Think back on your project strategies, methods, and activities, what worked and what did not? Is there anything you would do differently in the future? If so, tell us what and why. *

The establishment of an academic-industry partnership that started with the grant writing activity made a huge difference. Our industry partners not only followed our lead, but contributed substantially to the success of the project. In addition to bi-weekly virtual team meetings, we conducted 6 project workshops with Baker Hughes and Diamond Offshore Drilling every two months to present project deliverables, communicate administrative updates, and participate in discussions of project components. We also invited outside speakers to those workshops. For instance, Elizebeth Stanley from Georgetown University shared her expertise in conducting research on mindfulness in the military.

6.3. What are the next steps for this work, either for you and your project team or other researchers? Has this project led to other opportunities to work in this area? *

We met with the team of Scott Tannenbaum ("Development of an Evidence-Based, Multilevel Safety Culture Assessment Battery for the Offshore Industry") to discuss the building of supplemental resources - focus of assessment with emphasis on offshore facilities and the safety culture and readiness.

6.4. Have you developed new collaborations or partnerships (formal or informal) as a result of this work? If yes, please describe the new collaborations or partnerships. *

Dr. Peggy Lindner will implement a version of the mindfulness interventions in collaboration with Gilead, Science Inc. This study will test whether the safety, health and well being benefits can be measured in a manufacturing setting with maintenance workers practicing short mindfulness interventions.

6.5. What, if any, positive changes in policy or practice do you foresee as a result of your work? *

Mindfulness exercises, when adapted carefully to different workforce population groups, will become more widespread and mainstream in many blue-collar workplaces. They can be easily implemented as part of ongoing health and well-being initiatives in many industries.

6.6. If you could make one recommendation to the Gulf Research Program for how best to build on the work you conducted in this project, what would it be? *

We'd like to see expansions of our study both in scale and target worker population. Our initial results show promising results in terms of increasing health and well-being benefits for workers who practice short mindfulness exercises regularly. However, our study could not look into long-term effects. Also, safety-critical events, incidents and near misses are rare events, and an impact of the mindfulness interventions can only be measured in a long-term study.

7. Communication and Dissemination

Before the form is completed, you may click "Save & Continue Editing" at the bottom of the page at any time to save your work or "Next" to move onto the next page of this form.

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Note to Grantees: In Section 7, we ask you to help us communicate the importance, progress, and accomplishments of your work. Information provided in this section will be used by the Gulf Research Program to highlight its funded projects in print and electronic informational and promotional materials. The intended audience for the information provided in this section is different and should be thought of as a general audience. When you return to the dashboard, you may upload images that represent and illustrate the work of your project.

7.1. Please describe the most exciting or surprising thing you have learned while working on this project in a way that is understandable by a general audience. *

People who currently work offshore or have offshore working experience show great interest in the mindfulness techniques we have been preparing. Employees from our industry partners participated in several meetings to help customize training materials for use in offshore settings. Partner company employees tested the proposed mindfulness techniques, provided feedback and helped revise the techniques for subsequent formal pilot testing among current offshore employees.

7.2. Do you have any stories that capture the impact of this project? (optional)

If so, please share one or two. Examples of what we are interested in include stories of people/communities that the project has helped; lives that have changed; work that led to policy change, such as legislation or regulation; and research breakthroughs.

(No response)

7.3. Have any communications, outreach, or dissemination activities occurred in relation to your project?*

Please describe:

- Any press releases issued (other than that issued by the National Academies of Sciences, Engineering, and Medicine) about the project.
- Any media coverage or news stories about the project.
- Any social media accounts, websites, listservs, or other communication vehicles used to communicate information about this project. Please include relevant web addresses if available.

Our project website provides an overview of all relevant information, including news coverage for our project: https://uh.edu/uh-energy/research/nasem/

Our scale development work was featured in additional articles: https://www.houstonpublicmedia.org/articles/news/energy-environment/2020/04/29/368266/whats-next- for-thousands-of-laid-off-oil-and-gas-workers-in-houston/

Initial study press release:

https://uh.edu/news-events/stories/january-2020/01272020spitzmeuller-offshore-mindfulness.php

The press release was picked up by several industry outlets, including Rigzone and Crudeoilbrokers:

https://www.rigzone.com/news/can_mindfulness_improve_offshore_safety-28-jan-2020-160912-article/

https://crudeoilbrokers.blogspot.com/2020/01/can-mindfulness-improve-offshore-safety.html

https://www.energyvoice.com/health-safety-environment/220640/can-mindfulness-keep-offshore-workers-safe/

https://www.hrdive.com/news/researchers-to-test-whether-mindfulness-training-improves-safety/571505/

https://www.jmj.com/from-the-web/worker-safety/

https://www.newsbreak.com/texas/houston/news/1497197034029/can-mindfulness-keep-offshore-energy-workers-safe

Project Director Spitzmueller participated in an SPE panel focused on the energy workforce. The online session

was attended by more than 3,500 industry professionals. During the panel, Dr. Spitzmueller discussed the Offshore Mindfulness Initiative as a mechanism for improving the health, well-being and safety of GOM offshore workers. The link to the full discussion can be found at:

https://vimeo.com/410713621

Dr. Peggy Lindner gave a presentation in the UH Energy exhibition booth at the 2022 Offshore Technology Conference (OTC) in Houston (May 3, 2022).

Dr. Rhona Flin presented the project at the following conferences:

Offshore Energies UK HSE Conference, Aberdeen 28 June, 2022
Working on Safety Conference, Algarve, Portugal 26th September 2022
Offshore Energies UK Young Professionals Webinar 12 October 2022
Naturalistic Decision Making Conference, Orlando, 27 October 2022.