

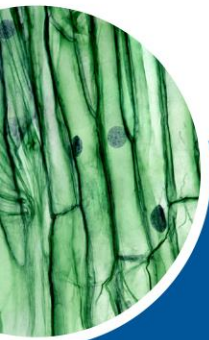


S-STEM Scholars Community Workshop

Mastering Engaging and Impactful Poster Presentations



October 9, 2024



NSF AWARD #2224093: AAAS-NSF
S-STEM Resource & Evaluation Center

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Agenda

I. Housekeeping, About the S-STEM REC & Scholars Community

II. Upcoming S-STEM PI & Scholars Meeting Related Opportunities

III. Mastering Engaging and Impactful Poster Presentations

a) Tips, Techniques & Best Practices

b) Resources

VI. Q&A

Housekeeping



Please keep your microphone on mute when not speaking. You are welcome to use the “raise your hand” button or type into the chat if you have a comment.



A great deal of how we communicate involves body language and nonverbal cues are helpful to let us know how you are responding to the discussion. If possible, please turn on your camera.



The chat and Q&A features are enabled. You can type questions into the chat or the Q&A box.



Please “rename” yourself to include your institution (or an abbreviation of it) as part of your display name and introduce yourself in the chat.



Closed Captioning is available. Click the "Live Transcript/CC" icon to access it.



Contact Jamila Blake in the chat or at jblake@aaas.org for technology questions or issues.

AAAS S-STEM Resource & Evaluation Center (REC)

The S-STEM REC seeks to cultivate a network of S-STEM stakeholders and promote the exchange of ideas, resources, opportunities, and knowledge related to the effective strategies and practices to increase the number of talented low-income students obtaining degrees in STEM and entering the STEM workforce.

AAAS S-STEM REC works to:



Increase the effectiveness of the S-STEM Portfolio



Build the capacity of S-STEM Network Programs



Build the capacity of S-STEM Scholars



This material is based upon work supported by the National Science Foundation (NSF) under Grant No. DUE-2224093. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF.

Join the S-STEM Scholars Community Today!

As a member of the S-STEM Scholars Community, students and alumni will be able to:

- Be part of an inclusive, safe, and welcoming community space
- Network and build community across S-STEM programs
- Engage in meaningful discussions and professional development
- Have access to employment opportunities and S-STEM resources



<https://www.linkedin.com/groups/12830947/>

Share Your Story with the S-STEM Community

Submit an S-STEM Scholar Spotlight

- Share your journey and vision for the future
- Builds community and expand your network
- Highlight your S-STEM experiences



2024 S-STEM Scholars & PI Meeting

November 8-10, 2024

Chicago, IL

Hyatt Regency Chicago



Upcoming Know Before You Go Info Session

October 29 at 3 p.m. ET

Last minute tips & reminders

Meeting agenda highlights & opportunities

Registration link: <https://tinyurl.com/yckaz3zb>



Chance to Change Lives Undergraduate Research Award

Applications Due Oct. 31

Apply Today



<https://tinyurl.com/228dweks>



S-STEM REC



Mastering Engaging and Impactful Poster Presentations

DR. RAMA BALA

CEO, Chance to Change Lives (CCL-US)

Executive Director STEMNetX Initiative



<https://www.stemnetx.org>



Why Presentations Matter

- ▶ Essential for **sharing research** with a wider audience
- ▶ Learning Opportunity through **feedback** from experts and peers
- ▶ Enhances public speaking and **presentation skills**
- ▶ Important for academic and **professional development**



Poster Presentation Techniques

1

Audience



Who are you presenting to?

2

Structure



How is the poster contents oriented?

3

Design



How easy is it to follow?

4

Present



How will you communicate your research?

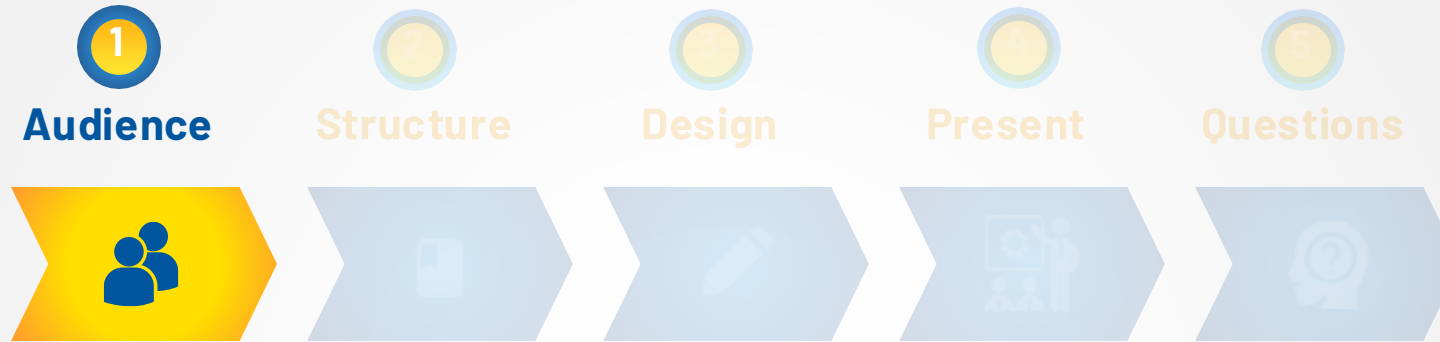
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Questions



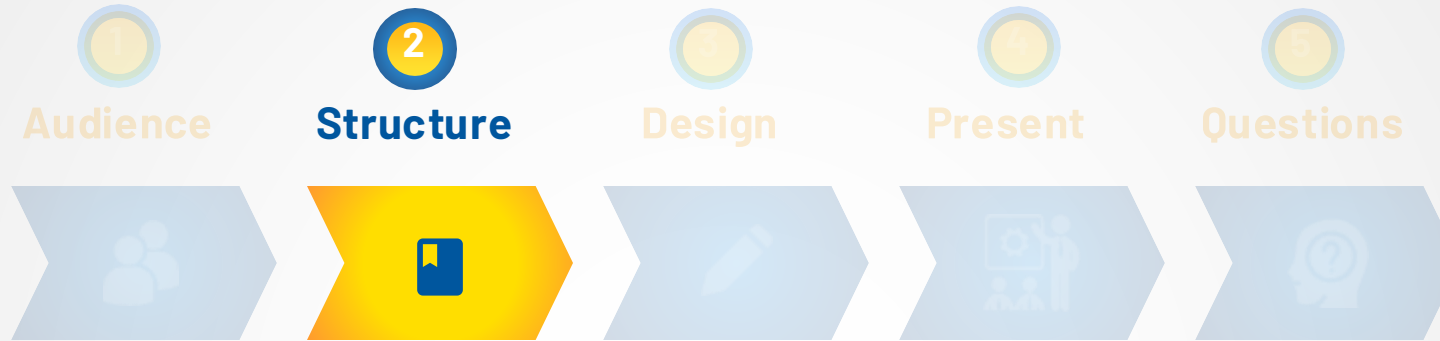
How should questions be handled?

Understand the audience



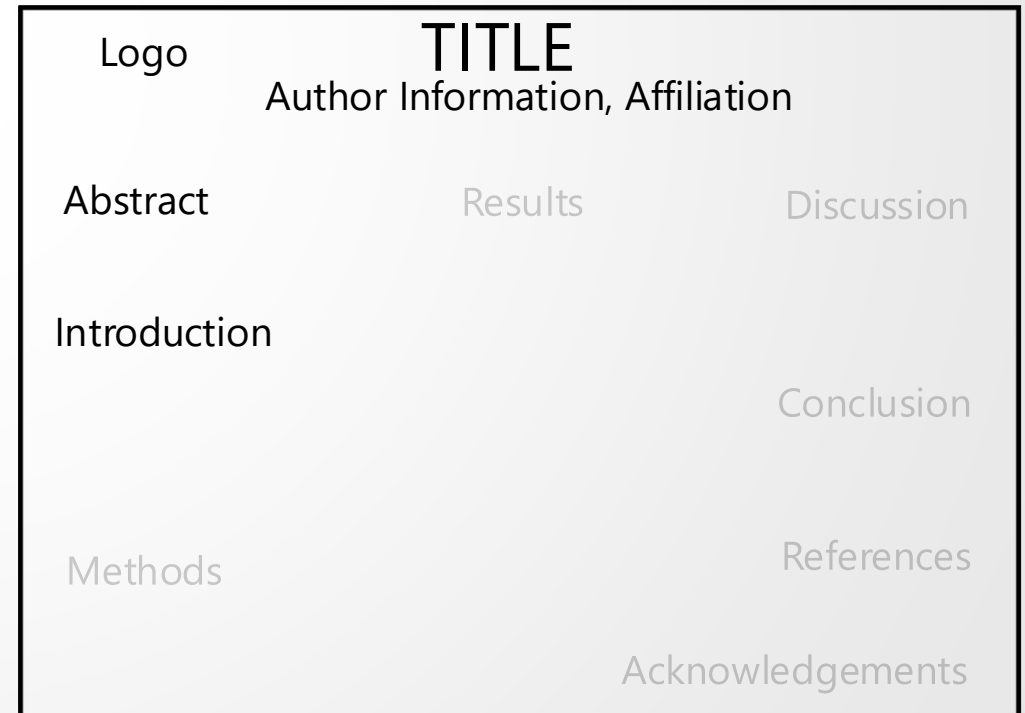
- Prepare the poster for both **specialists** and **non-specialists**
- **Tailor** to your audience when presenting poster
- Focus on delivering **clear** and accessible information

Structure of an Effective Poster

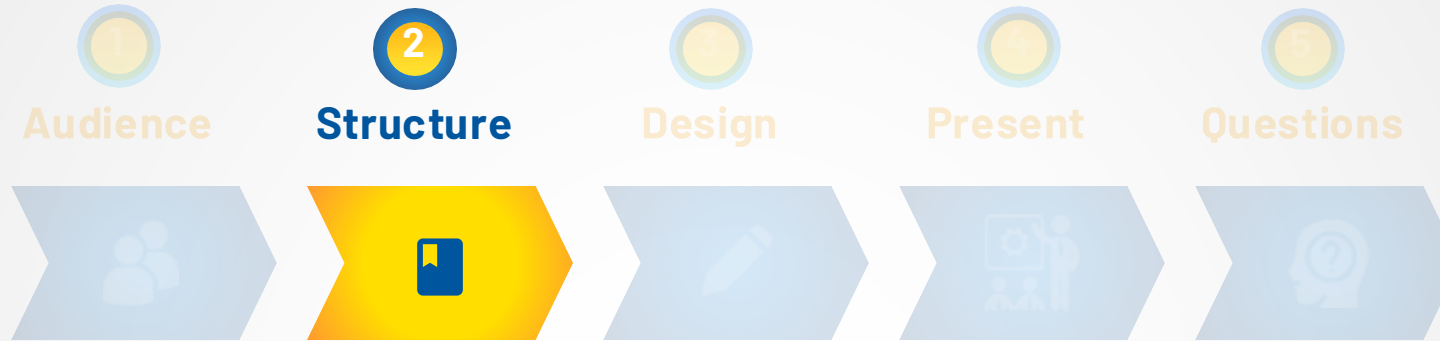


How is the poster contents oriented?

- **Title:** Should be concise and engaging
- **Abstract:** A brief summary of the project (Optional)
- **Introduction:** Background and objectives of the study
 - Theory, Gaps, Problem statement, Hypothesis



Structure of an Effective Poster



How is the poster contents oriented?

- **Methods:** How the research was conducted (visuals help here)
- **Results & Discussion:** Key findings (use graphs and charts)
- **Conclusion:** Interpretation & significance of the results
- **References and Acknowledgments**

	TITLE	
Abstract	Results	Discussion
Introduction		Conclusion
Methods		References
		Acknowledgements



A nanoscale approach to understanding the biology of senescence

Subhadeep Ghosh¹, Austin Sims¹, Kritika Chaddha¹, Alberto Bertozzi¹, Kriti Gupta², Rama Balasubramanian^{1,3*}, Aditi U. Gurkar^{1,4*}

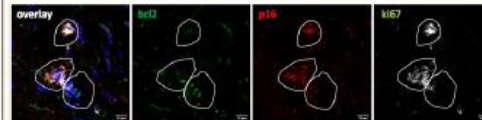
¹Aging Institute, Division of Medicine, University of Pittsburgh; ²Upper Saint Clair High School, Pittsburgh, PA;

³STEMnetX Program, Chance to Change Lives (CCL-US), Pittsburgh, PA; ⁴Division of Geriatric Medicine, Department of Medicine, University of Pittsburgh, Pittsburgh, PA

Introduction

Senescence

- Cell fate decision characterized by stable state of cell cycle arrest, resistance to apoptosis and release of senescence associated secretory phenotype (SASP)¹.
- Accumulation of senescent cells increases with age and can drive multiple age-related pathologies.
- Genetic and pharmacological elimination of senescent cells significantly improved health and delayed onset of aging symptoms in animal models^{2,3}.
- However, there is no unified marker for senescence.
- This makes it challenging to understand the frequency, dosage and efficacy of senotherapeutics.



RNAscope of 3 markers of senescence *Bcl2*, *p16* and *Ki67* display heterogeneous expression

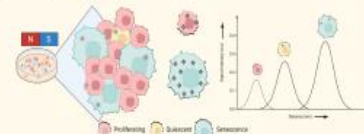
Nanoparticles

- Nanoparticles range from 1-100 nm and have high surface to volume ratio, modifiable morphology and crystallinity.
- Magnetic nanoparticles (MNP) exhibit hyperfine crystallinity, superparamagnetic behavior, and are biocompatible, biodegradable and have been widely used in nanomedicine⁴.
- The magnetocrystalline anisotropic energy $E(\theta)$ for superparamagnetic states is dependent on the volume (V) and the chemical environment of MNPs where K is the anisotropic constant⁵.

$$\epsilon_{(g)} = KV \sin^2(\theta)$$

Hypothesis

- $\epsilon_{(g)}$ is sensitive to the changes in the size, shape, volume, iron content, defects, and crystalline vacancies of MNPs⁶.
- MNPs will detect these hyperfine changes and provide unique magnetic signatures for senescence

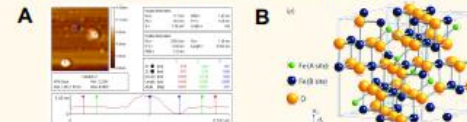


Materials and Methods

$FeSO_4 + FeCl_3 + CoCl_2 \xrightarrow{\text{oxide transformation}} \text{Maghemite MNPs. } (Fe_{1-x}Co_x)_2O_3$
 Substitutions of Co^{2+} ions: ANP1= 0%; ANP2= 1% and ANP3: 3%. (1st generation MNPs).
 Substitutions of Co^{2+} ions: BMR 3A= 0% and BMR-6A= 3% (2nd generation MNPs).
 RITC: Rhodamine B isothiocyanate.

Results

Figure 1: Characterization of maghemite nanoparticles



- A. MNP synthesized with or without Co^{2+} substituents in the nanocrystalline maghemite (Mh) displays a size of 5.45 nm through magnetic force microscopy (MFM).
- B. The substitution process allows Co^{2+} to occupy octahedral sites, thereby forcing Fe^{3+} into tetrahedral sites. This ensures the growth of stable inverse spinel structure of cation substituted maghemite.
- C. X-Ray diffraction spectra suggest prominent peaks that are characteristic of nanophase maghemite with Co substitution. As the amount of Co^{2+} concentration increased from 0 wt.% for sample ANP1 to 3wt.% for ANP3, the most prominent (311) peak increased from 0.941 to 1.054.
- D. Raman spectra of 367, 542, 2750 cm^{-1} suggests organic peaks, whereas other inorganic peaks around 350 cm^{-1} suggests Fe-O bending, 500 cm^{-1} for octahedral Fe ions asymmetric stretching and 700 cm^{-1} for tetrahedral Fe ions symmetric stretching.

Figure 2: In vitro cell cycle and toxicity assay of MNP

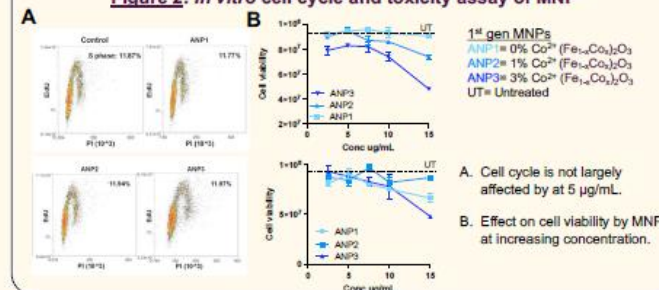
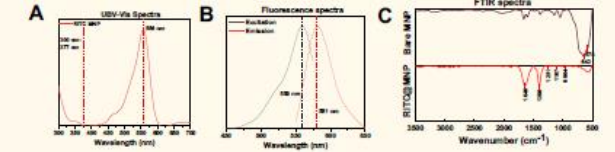


Figure 3: Characterization of Rhodamine b-isothiocyanate capped MNP



- A. UV-Vis absorption peak at 300-377 nm = Maghemite and peak at 556 nm = RITC.
- B. Excitation of 559 nm and emission around 581 nm = successful conjugation of Rhodamine with MNP.
- C.
- | (Fig 3C) FTIR spectra | | | |
|-----------------------|------------------------------------|----------------|------------------------|
| 578 cm^{-1} | Fe-O stretching (octahedral site) | 1250 cm^{-1} | C=O stretching (ether) |
| 643 cm^{-1} | Fe-O stretching (tetrahedral site) | 1107 cm^{-1} | S=O stretching |
| 1640 cm^{-1} | C=O stretching (amide) | 964 cm^{-1} | C-C stretching |
| 1398 cm^{-1} | C-N stretching | | |
- D. High-res confocal imaging suggests the presence of MNP around the nucleus

Conclusion

- We have synthesized maghemite MNP with or without the substitution of Co^{2+} (0%-3%) ~5.45 nm and with a spinel structure.
- Synthesized MNPs are biocompatible and do not affect cell cycle and are non-toxic at low concentrations
- To determine location of MNPs, they were conjugated with Rhodamine and displayed cytoplasmic localization.

Future work

Monitor changes in the magnetic signature of senescent versus proliferating and quiescent cells by performing Magnetic Force Microscopy (MFM).

References

- Gurkar A. et al. Nature Aging, 2023
- Baker D. et al. Nature, 2011
- Zhu Y et al. Aging Cell, 2015
- Wu K et al. Nanotechnology, 2019
- Kafrouni L. et al. Prog Biomater 2016
- Peana M et al. Front Oncol, 2023

Acknowledgements

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Example

Design Tips for a Visually Appealing Poster



- Use a clean layout with **clear sections**
- **Limit text** and use bullet points for clarity
- Headings and subheadings should **stand out**
- Ensure high-quality images (graphs, photos, illustrations)

Design Tips for a Visually Appealing Poster



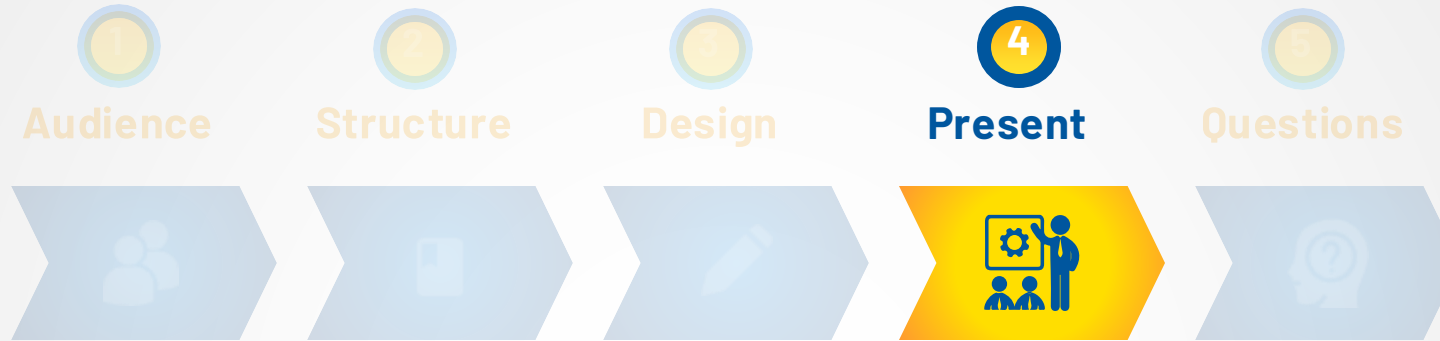
- Use **contrasting colors** to make it easy to read
- Choose **legible fonts** (e.g., Sans Serif, Arial, Calibri)
- Use a large enough **font size** to be seen from afar

Best Practices for Presenting Data



- **Graphs:** Use bar, line, or pie charts to display data trends
- **Tables:** For detailed numerical data, but keep them simple
- **Avoid clutter:** Present data in a concise manner
- Clearly **label** axes and provide legends where needed
- **Photos/Diagrams:** Use for visualize complex ideas

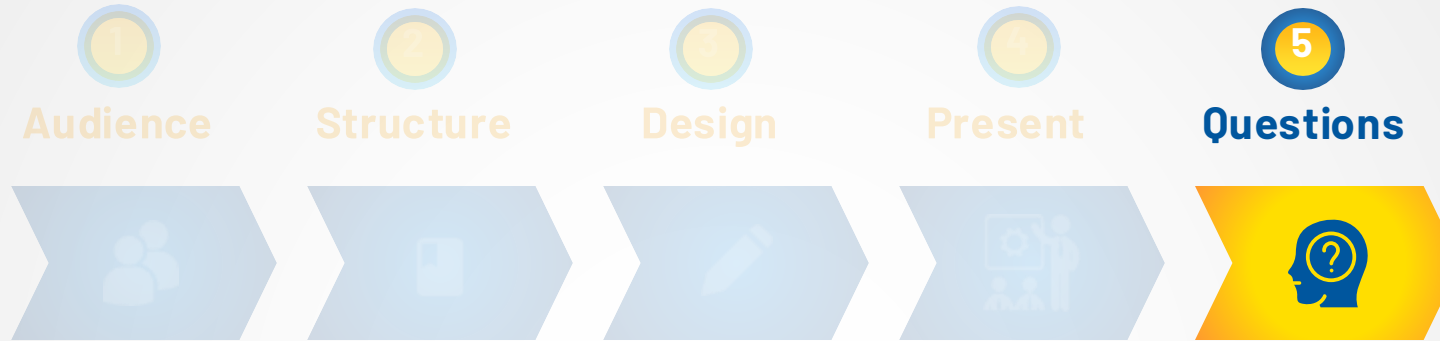
Presentation Skills



How will you
communicate your
research?

- Prepare by **practicing** your presentation multiple times
- Keep your talk **short** (2-3 minutes) and leave room for questions
- **Avoid reading** directly from the poster—summarize the key points
- Use simple, **clear language** to explain complex concepts
- Engage your audience with **eye contact** and an approachable demeanor
- **Dress professionally**, typically dress business casual

Handling Questions



How should
questions be
handled?

- Open the floor to questions and comments
- Use this time to **clarify** any points and offer additional tips
- **Encourage audience participation**
- **Listen** carefully to the question before answering
- If you don't know the answer, it's okay to say so and offer to follow up
- Be **respectful** and open to feedback and critique
- Use questions as an opportunity to show **depth** in your research

COMMON MISTAKES

TO AVOID

01

Too much text: Avoid overloading the poster with information

02

Poor visuals: Don't use blurry images or overly complex graphs

03

Cluttered design: Leave enough white space for readability

04

Inconsistent fonts or colors: Keep it professional and cohesive

05

Failure to engage: Don't stand still—interact with your audience!

Final Tips for Success



Plan Ahead:

Give yourself plenty of time to design and revise the content of the poster.

Make sure you have time to properly print the poster.



Seek feedback:

Have peers or mentors review your poster



Arrive Early:

Arrive early to your presentation and set up your poster properly



Stay confident:

Know that you're the expert on your work!

Other Resources



Templates & Tutorials

[PowerPoint Tutorial - Windows](#)

[PowerPoint Tutorial - MacOS](#)

[Canva Tutorial](#)

["Making a Better Research Poster"](#)

[Templates](#)



Resources for Presentation Skills

["How to present your poster"](#)

["How to Design Effective Research Posters and Deliver Powerful Academic Presentations"](#) by Martin Zaumanis



Practice Makes Perfect

Practice often! Practice with friends, family, or colleagues.



Summary

You should now know:

- How to effectively present your work through posters
- What are the elements of a good poster presentation
- The dos and don'ts of visuals and graphics
- How to engage with audience



ANY QUESTIONS?

THANK YOU FOR ATTENDING

If you have any further questions or would like to explore opportunities, please don't hesitate to reach out to us.

contact@ccl-us.org

Chance to Change Lives / STEMNetX



Provide Your Feedback on Today's Event!

Survey Link:

<https://airtable.com/appfPQTUXvefS5yf7/shriEUnWxFkznLcDh>





Thank you!

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