Scholarships in STEM (S-STEM)

Tips On Developing Your Research And Evaluation Plans
for the 2023 S-STEM grant proposal

February 8, 2023
10.30 am to Noon ET
4 pm to 5.30 pm ET

in s-stem-program

🐦 @sstem_program

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

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Who We Are

NSF Scholarships in STEM Network Solicitation

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

AAAS | S-STEM REC

MNA

AIR

Quality Education for Minorities (QEM) Network

CERSE

S-STEM REC Vision

The AAAS S-STEM Resources & Evaluation Center (REC) seeks to cultivate a network of S-STEM stakeholders and further develop the infrastructure needed to 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 Goals

To **build the capacity of S-STEM Network programs** by identifying program leadership needs and supporting their growth by leveraging context-conscious support, communication, resources, and knowledge across S-STEM projects with the aim of increasing their program effectiveness.

To **build the capacity of S-STEM Scholars** through professional development and connection to career-building opportunities aimed at increasing their ability to successfully navigate pathways into the STEM workforce or graduate studies.

To **increase the effectiveness of the S-STEM portfolio** by synthesizing evidence of outcomes and impacts across the entire network and disseminating those findings to support evidence-based decision-making across the STEM ecosystem to increase the access and success of academically talented students with financial need.

Evaluation Capacity Development

Technical Assistance Suite

Facilitated by MN Associates, Inc.

▶ Kavita Mittapalli, Ph.D.

▶ Nina de las Alas

▶ Audience: Prospective and current S-STEM PIs, Co-PIs, social science researchers, and evaluators

▶ Focus: generation of knowledge, research, and evaluation plans for proposals and ongoing grants for all Tracks

Evaluation Capacity Development

▶ Activities through March 29th, 2023:

- **Generation of Knowledge and Evaluation Plan development webinars**

- FAQs and Resources on GoK and Evaluation (e.g., study plan, design, methodology, budget)

- Email consultation to review and provide feedback on current proposals' GoK and evaluation plans

- Request Eval Assistance: https://forms.office.com/r/f09vRxMzvs

S-STEM REC Evaluation Technical Assistance Request Form
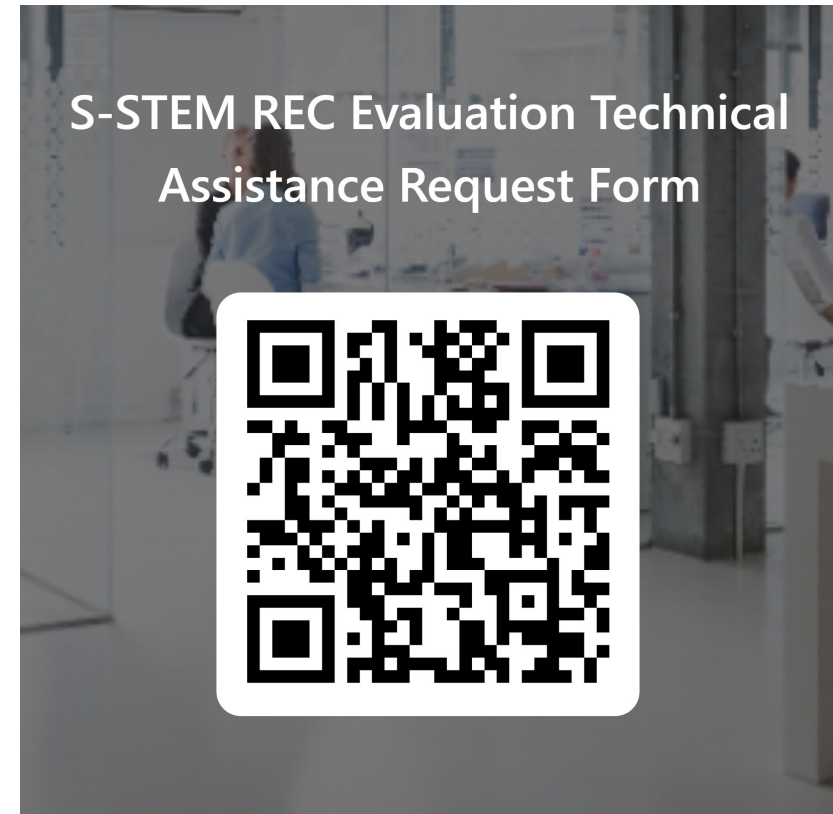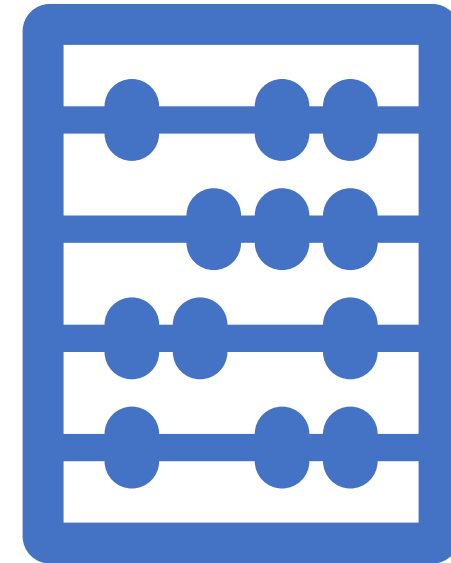
Objectives

Primary

To gain a better understanding of:

1. Generation of Knowledge (GoK)
2. Writing a research plan for Track 3
3. Designing an evaluation plan for Tracks 1, 2, and 3

Secondary

To collect feedback on:

1. Effectiveness of the webinar's format (via a survey)
2. Gather questions and understand needs of attendees and current awardees

Agenda

2023 S-STEM changes overview – a quick recap

2023 S-STEM Solicitation: Generation of Knowledge– Research and Evaluation

Roles and requirements per Track

Research Plan and Research Questions

Evaluation Plan and Evaluation Questions

Theory of Change and Logic Model

How and when to engage a Researcher and an Evaluator – pre-and post-award

Advisory team vs. Evaluator

Questions

Resources

2023 S-STEM Changes: A Quick Overview

- Maximum award amounts for Track 1 (now $1,000,000) and Track 2 (now $2,500,000) increased.

- Maximum scholarship amounts increased to $15,000/year undergrad and $20,000/year graduate (master's or Ph.D.)

- Maximum duration of scholarships increased to 5 years per degree.

- Scholarship Calculation: scholarships should meet students' unmet need, up to the max allowable amount. S-STEM remains a last-dollar scholarship.

- Involvement of Financial Aid Offices: must be part of determining the definition of low-income, scholars' eligibility, and scholarship amounts.

- Project Viability: proposers should demonstrate that comparable numbers of eligible students have enrolled in the disciplines/degrees.

Source: National Science Foundation

Polling time!

Generation of Knowledge

At its core, scientific inquiry is the same in all fields. Scientific research, whether in education, physics, anthropology, molecular biology, or economics, is a continual process of rigorous reasoning supported by a dynamic interplay among methods, theories, and findings. It builds understanding in the form of models or theories that can be tested.

Source: Scientific Research in Education, National Research Council, 2002

GENERATION OF KNOWLEDGE
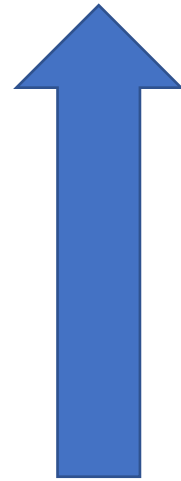
Research
Track 3
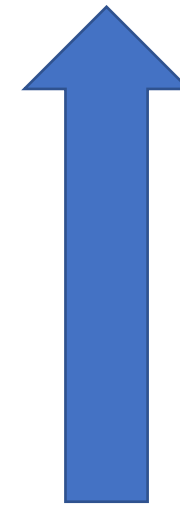
Evaluation
Tracks 1, 2, and 3

Research Plan and Study
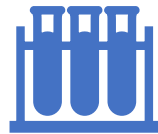
Education or social science research literature

Linked with specific needs of the student population being served at the institution(s) (student archetype) (think unit of analysis)

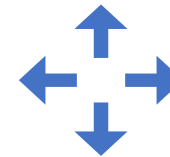Proposed intervention for your institution(s)

Study design: Exploratory, Descriptive, Correlational, QED to measure the efficacy and/or effectiveness (IES/USDE, NSF 2013)

Testing a theory and have a hypothesis (if…then…)

Measuring: Does it work? How does it work?

Generalizable in nature.

Research Questions

- In what ways does/do (participants engage in an activity or an intervention)….?

- In what ways does (a particular intervention) work?

- How does (an intervention) show its intended effects on participants'/stakeholders' cognition and/or affective behaviors?

- If and how participants' background characteristics (e.g., demographics, academic performance measures, affective factors) play a role in decision-making for choosing:
    - STEM majors
    - Engaging in training opportunities
    - Utilizing available resources
    - Services, and
    - Careers/jobs when exposed to the intervention(s)?

Examples
(Cognitive/Behavioral/Dispositional/Situational Attributions)

1. What (if any) is the relationship between increased academic advising, (peer)/mentoring, and research/internship/university partnerships and opportunities and S-STEM scholars':

   (1) course-taking habits

   (2) course success

   (3) STEM identity

   (4) Retention

   (5) completion

   (6) vertical transfer and/or
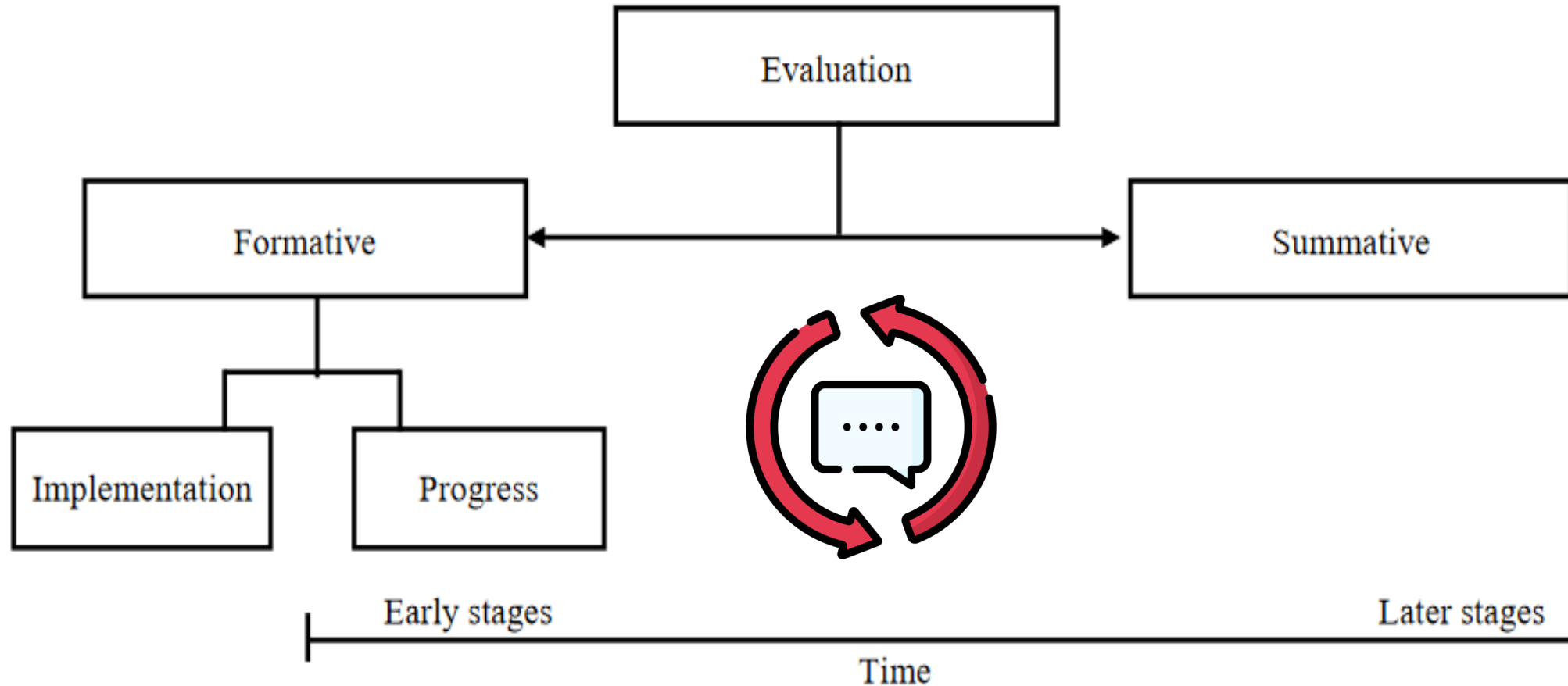
   (7) joining the STEM workforce?

2. How does increased academic, non-academic, and financial support for S-STEM students relate to their levels of self-efficacy, persistence, completion, and overall academic performance?

Evaluation (all Tracks) (Ref. unit of analysis=program)

Iterative process with a feedback loop

PIs make changes based on the evaluation findings

Evaluation Data Matrix

Evaluation Question:					
Indicator	**Data Source and Methods**	**Responsible Party**	**Timing**	**Analysis Plan**	**Interpretation**

Evaluation Question: [state evaluation question, add rows as needed for additional evaluation questions and related indicators]				
Indicator	**Data Source & Collection Method**	**Timing**	**Analysis**	**Interpretation**
[what will be measured – ideally there will be more than one indicator per evaluation question]	[where the data will come from and how it will be obtained]	[when the data will be collected]	[how the qualitative and quantitative data will be transformed and summarized into usable information]	[procedures for using findings to answer the evaluation questions and reach evaluative conclusions]

Source: evalu-ate.org

Examples

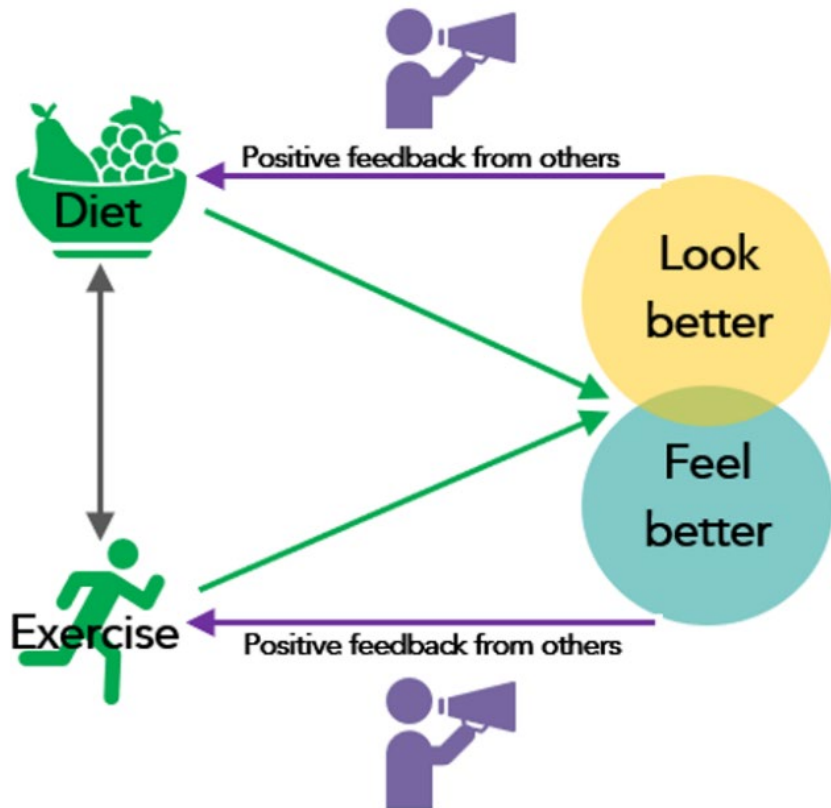To what extent is the S-STEM program meetings its stated goals and objectives?
What are some of the good practices and lessons learned?

With what quality and timeliness are research activities for the project planned and implemented, relative to anticipated progress toward achievement of project goals and objectives as they relate to engagement, retention, and completion of the students being served in the program?
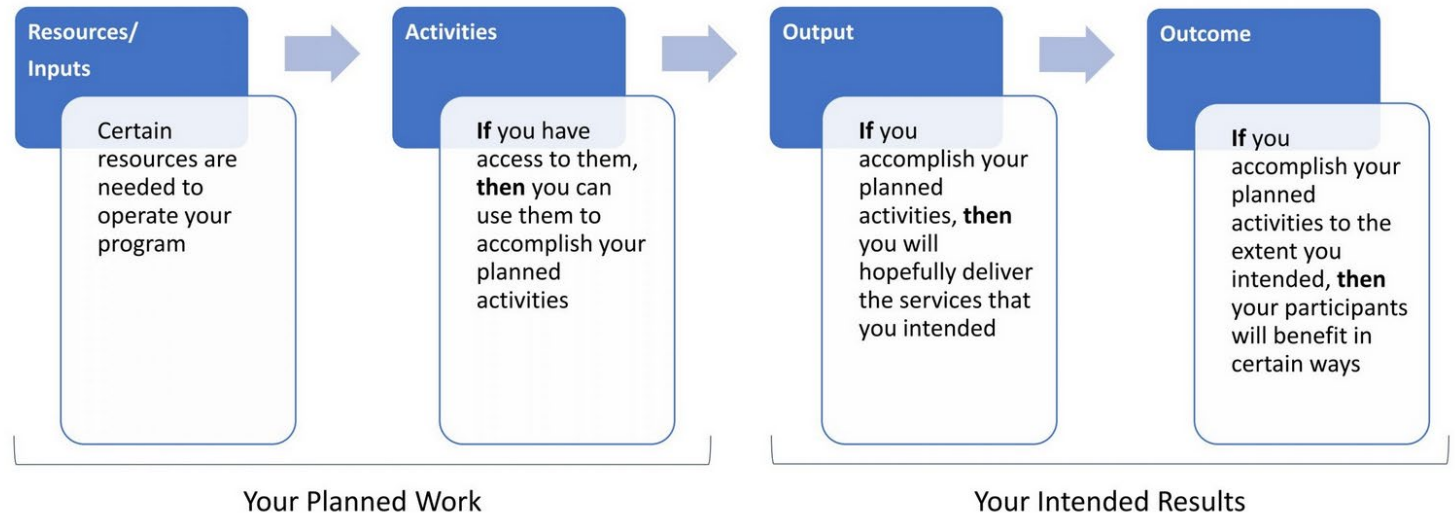
What is the potential for broader impacts to be realized by the project being implemented?

What is the intellectual merit of the research effort, in terms of its contributions to an understanding of STEM interest and learning, and careers/jobs upon graduation? (Track 3)

Theory of Change and Logic Model

Thinking of Logic Models as a Series of *If . . .Then* Statements

Resources/Inputs → Certain resources are needed to operate your program

Activities → **If** you have access to them, **then** you can use them to accomplish your planned activities

Output → **If** you accomplish your planned activities, **then** you will hopefully deliver the services that you intended

Outcome → **If** you accomplish your planned activities to the extent you intended, **then** your participants will benefit in certain ways

Your Planned Work   Your Intended Results

Adapted from: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention (https://www.cdc.gov/dhdsp/evaluation_resources/guides/logic_model.htm).

Source: Patton, 2008. Utilization-Focused Evaluation, 4th Edition

Engaging a social science researcher and an evaluator

- Partner-Collaborator

- Engage early and often

- Totally external or someone from another department within your institution

- (If external) General qualifications of an evaluator

- Proposal planning, evaluation plan, logic model/theory of change
  For T3: Research and Evaluation plan: avoid conflation

- *(Setting) General expectations* from a 3rd party evaluator: before and after the award

- Institution's procurement procedures

- Budget (2-5% of the total Budget) (ref. NSF's FAQs)

An evaluator or an advisory?

- Roles and functions
- Deliverables (e.g., evaluation report)
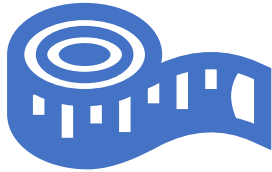- Expectations
- Conflict of Interest (COI)
- Budget

After an award is made....

- Contract "before" they begin work

- Institutional Review Board (IRB) approval

- Kick-off meeting: Refine the evaluation plan, questions, deliverables, timelines, and work expectations

- Attend team meetings (periodically)

- Document review

- Site visit(s)

- Fall and Spring surveys to participants and stakeholders (pre-post)

- Attend advisory meeting(s)

- Coordinate with the IR team for extant data and Researcher (T3)

- Data summaries from the data collected; feedback to PI team to make changes

- Interim report (years 1-5) summative/final report (year 6) and Dissemination efforts
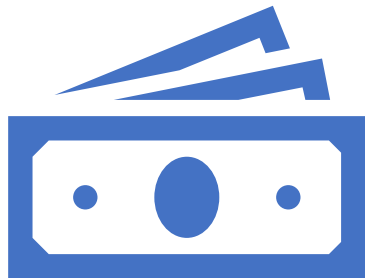
NSF FAQs

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#26

https://www.nsf.gov/pubs/2023/nsf23044/nsf23044.jsp

References

1. National Research Council: https://nap.nationalacademies.org/catalog/10236/scientific-research-in-education

2. Common Guidelines for Education Research and Development: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126

3. Evaluation matrix: https://evalu-ate.org/wp-content/uploads/2017/07/eval-matrix-2017.pdf

4. TOC and LM: https://analyticsinaction.co/theory-of-change-vs-logic-model

5. LM (Kellogg's): https://wkkf.issuelab.org/resource/guiding-program-direction-with-logic-models.html

6. CDC: https://www.cdc.gov/tb/programs/evaluation/Logic_Model.html

7. https://www.theoryofchange.org/wp-content/uploads/toco_library/pdf/TOCs_and_Logic_Models_forAEA.pdf

8. https://www.mdc.edu/grant-development/documents/NSF%20Logic%20Model%20Template.pdf

Thank You!

Connect with the REC:

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in www.linkedin.com/company/s-stem-program

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