

## IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

## Lift Off - Secondary Space Education (2)

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IMAGINE, INSPIRE, INNOVATE: TEACHER-RESEARCHER SPACE SCIENCE PARTNERSHIPS  
CATALYZE STUDENT OPPORTUNITIES IN STEM

**Abstract**

Imagine, Inspire, Innovate: Imagine the possibilities. What if teachers partner directly with astronomers and space science researchers to engage in authentic, relevant, and real-time space science lessons and research that model industry? How might teacher leaders be inspired and in turn inspire their colleagues and students if teacher leaders are supported and empowered to leverage their knowledge about their students to catapult STEM learning through space science? What level of innovation is possible when the perfect storm happens—partnering teachers with world-class researchers, supporting instructional shifts, and empowering and developing teacher leaders to scale their work? Early work with the NASA Explorer School program subsequent work with the Northwest Earth and Space Science Pipeline clearly demonstrates the high return investment when teachers are directly engaged with research. For students to investigate and learn space science, teachers must gain the skills and knowledge necessary to engage in research and scale their experience. By directly partnering with NASA and space science researchers, teachers connect students with real-time space science. Teachers engage in engineering challenges and space science research-by doing this, teachers are modeling what they expect of students. Our work with teachers has three foundational components: 1. Direct Impact on Teachers: Increase teacher STEM (Science, Technology, Engineering, and Math) content knowledge and research practices utilizing NASA Mission Science and direct partnerships with researchers. 2. Scale via Teacher Leadership: Empower teachers to transform STEM instruction of others utilizing best practices, state standards, connections to industry, and STEM Teacher Leadership training. 3. Strengthen the STEM pipeline and Eliminate the Opportunity Gap: Support partners to strengthen the STEM pipeline via collective impact utilizing NASA Mission Science. From investigating the how satellite technology and gravity are used to study sea ice change to determining nova distribution in the Andromeda galaxy to

learning how astronomers determine the composition of stars, teachers and students engaged in real-time space science investigations that are aligned with current space science, in a manner that is meaningful for their students. Teachers and researchers work through the learning together, launch career-connected learning experiences for students, and set the stage for students to be future ready and thrive in Washington's vibrant environment. Qualitative and quantitative data from an external evaluator indicate increased teaching effectiveness; qualitative and quantitative data from teachers and assessments indicate increased student understanding; and powerful feedback from students indicates increased understanding and application along with increased entry into space science fields.