EXECUTIVE SUMMARY

This publication describes the Keck/PKAL (Project Kaleidoscope) Model for Systemic Institutional Change in STEM Education. The model was created in response to the need to improve student learning outcomes and success, particularly for students from underrepresented minority (URM) populations. Many change efforts in the STEM (science, technology, engineering, and mathematics) disciplines have been developed, but few have reached the transformational level of influencing entire programs, departments, or colleges. This model describes both a process and the content scaffold for campus leaders to plan, implement, assess, and evaluate change efforts in undergraduate STEM education in a way that goes beyond redesign of a single course or isolated program.

The Keck/PKAL model begins by establishing a vision and goals for the change project. It then guides campus teams through an analysis phase of gathering data and collecting information about the current STEM learning outcomes and student success landscape. This analysis leads to the identification of specific campus challenges, which are defined by the data and couched in the context, mission, and priorities of the campus. These challenges establish the outcomes of the change project and lead teams to choose, implement, and evaluate specific strategies that will improve STEM student learning outcomes and success.

Because any change process is dynamic and nonlinear, this model takes the shape of a flow, much like a river where there are multiple points of entry (and exit) as well as obstacles that create eddies along the way. Included in this publication is a rubric developed to help campus teams gauge their progress through the phases of the change process. This guidebook provides benchmarks, key questions for analysis, timeline information, challenge alerts that help leaders anticipate common roadblocks, and practical tools and information that will assist campus teams in their efforts. One of those tools, a Readiness Survey, can help teams determine whether they are prepared to implement their chosen strategies and interventions.

This guidebook is for campus leaders and administrators who are poised to mount more comprehensive reforms. It contains advice for leaders on topics such as getting started, addressing implicit theories of change, avoiding mistakes, facilitation and project management, scale of change, team and leader development, and sustaining change, as well as leader reflection questions. All of this guidance is geared toward the practicalities of leading and managing change processes. Example case studies developed by campus teams participating in the project provide real-world illustrations of change processes in undergraduate STEM education.