SUCCESSFUL STEM STUDENT PATHWAYS:
A TWO- AND FOUR-YEAR PARTNERSHIP

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PALOMAR COLLEGE
Learning for Success

California State University
SAN MARCOS

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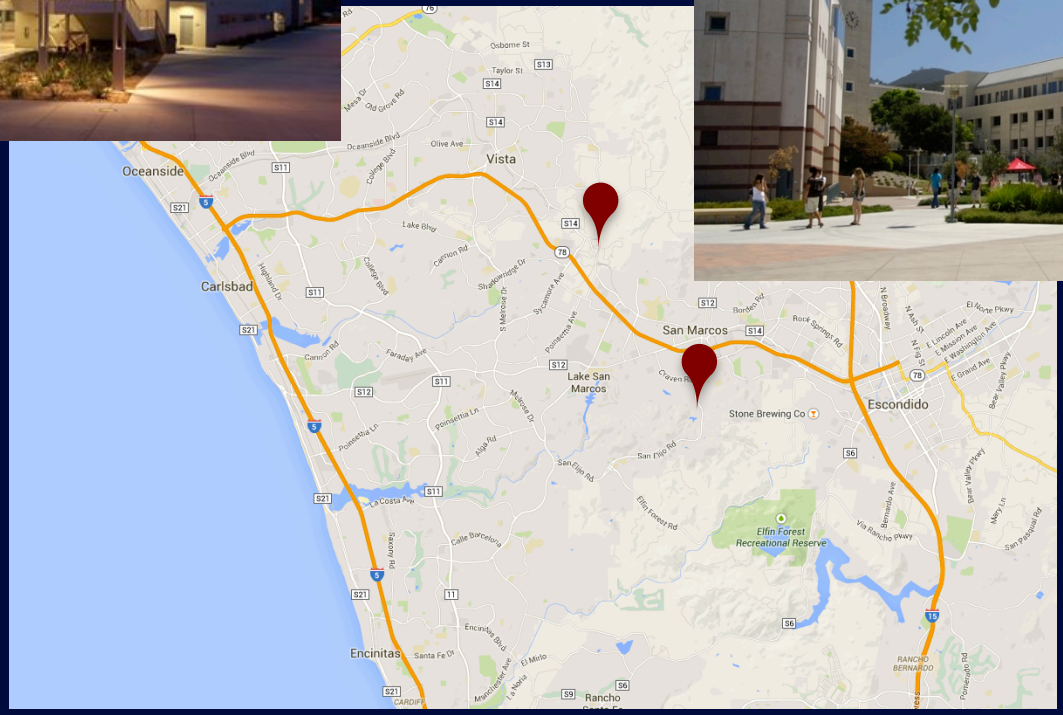
CSU MSTI

CSUSM AND PALOMAR COLLEGE – NORTH SAN DIEGO AREA



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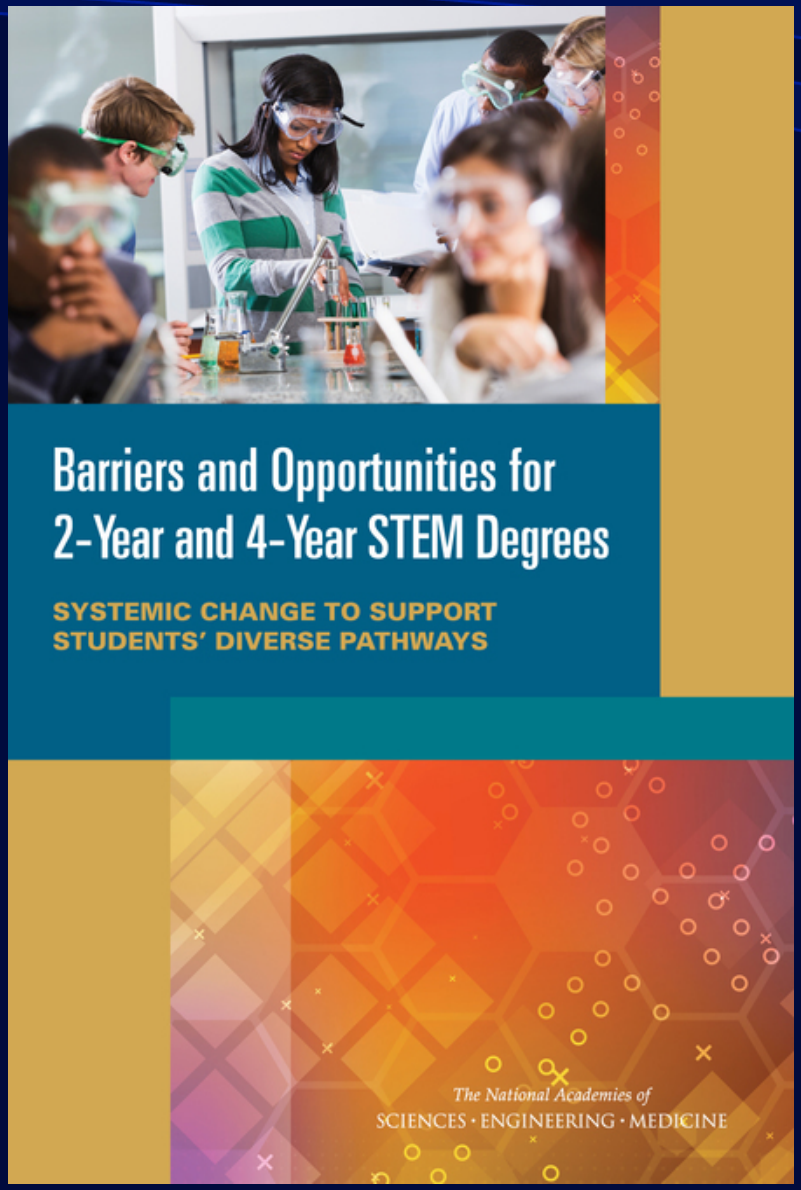
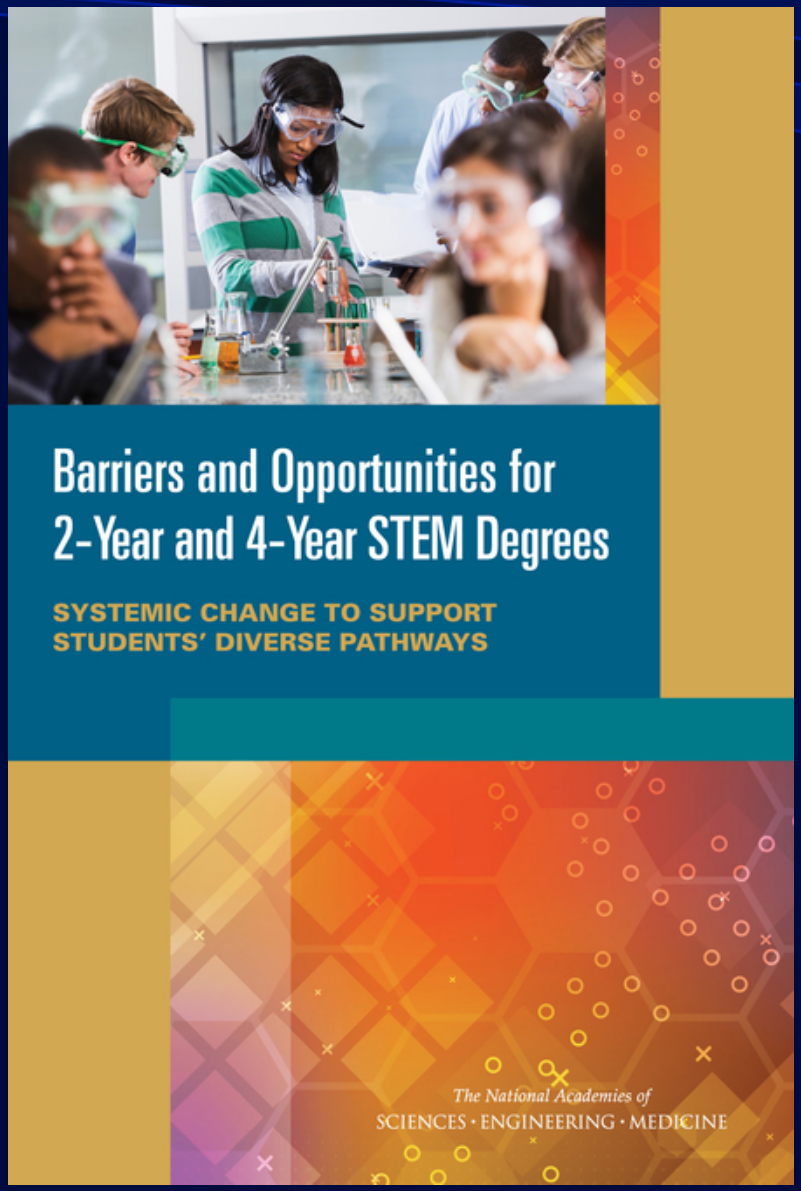
Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways

- National Academies

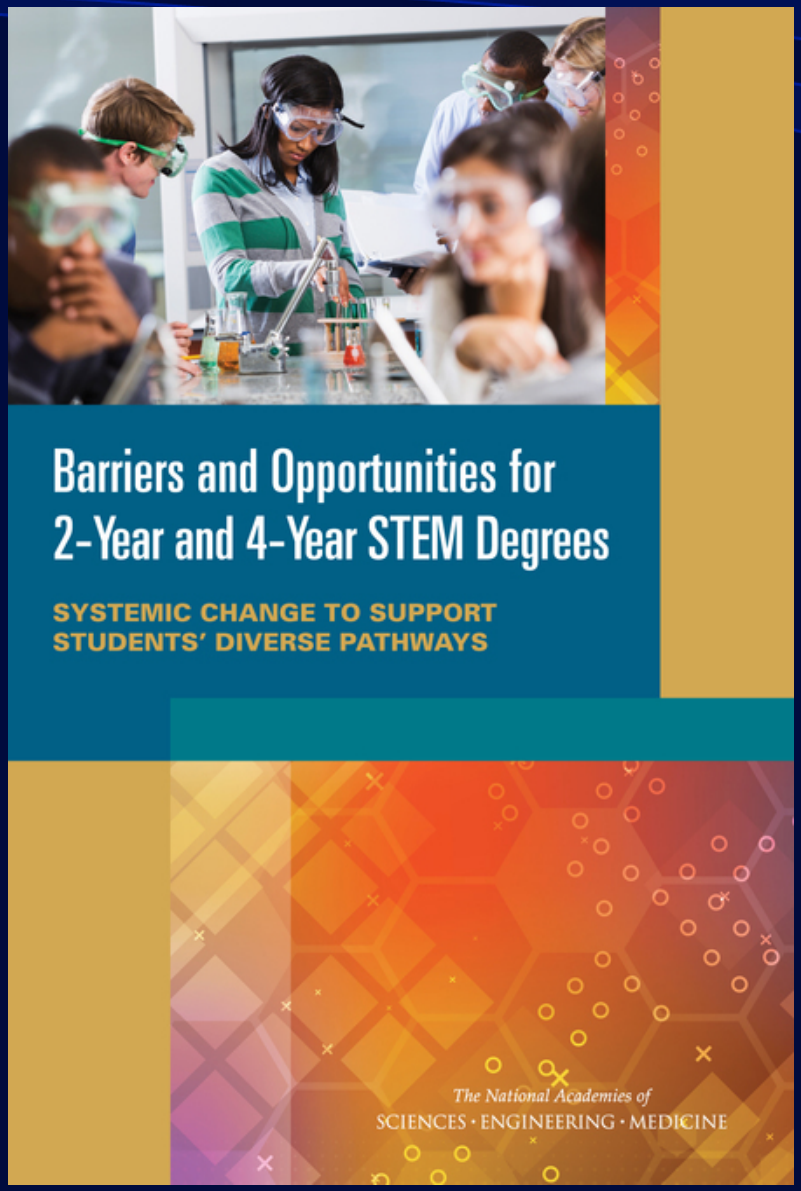


"A diverse range of students take varied paths to earn STEM degrees… Contrary to the image of a linear route to a bachelor's degree in STEM (often referred to as the STEM pipeline), we found instead a complex array of pathways"

"Students use 2-year and 4-year institutions in ways likely not envisioned by educators and policy makers, with frequent transfers, concurrent enrollment at multiple institutions, and multiple points of entry, exit, and reentry to the pathways."



"Improving STEM education for all students will require a more systemic approach that includes use of evidence to support institutional decisions, ***learning communities and faculty development networks, and partnerships across the education system.***"



CSUSM – PALOMAR PARTNERSHIP

Challenge

- How to improve coordination and facilitate student transfer/graduation between 2- and 4-year institutions?
- What programs and practices build and support a robust partnership and lead to more and better positive outcomes for all students?

FOUR PROGRAM ELEMENTS

- Active Learning Pedagogy Support Program (*ALPS*)
- Cross-Campus Learning Assistant Program
- Physics-Specific Linkages
- Administrative Partnerships

ACTIVE LEARNING PEDAGOGY AND SUPPORT (ALPS)

- Discipline Specific Faculty Learning Community
- Focus on STEM gateway courses
  - Math and Chemistry
    - (*Physics this coming year*)

- Model:
  - Bi-monthly first semester
  - Implement reforms in second semester
  - Supported by faculty stipend and LA's

ACTIVE LEARNING PEDAGOGY AND SUPPORT (ALPS)

- Discipline Specific Faculty Learning Community
- Focus on STEM gateway courses
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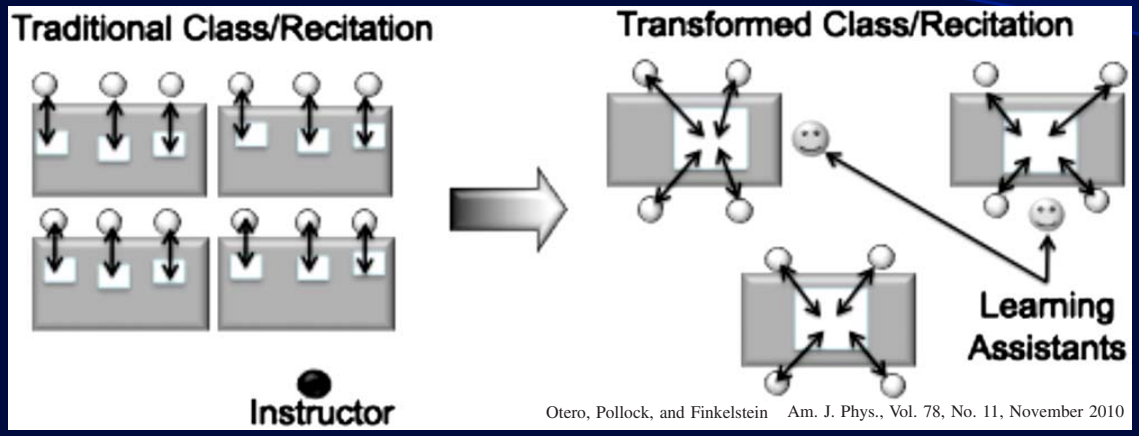
- Model:
  - Bi-monthly first semester
  - Implement reforms in second semester
  - Supported by faculty stipend and LA's
- Participants included faculty from *both* campuses
  - Fostered communication and sharing of curriculum
  - Positive feedback from faculty

LEARNING ASSISTANT PROGRAM

Experienced students help faculty facilitate in-class activities



CROSS-CAMPUS LA PROGRAM

- Pilot effort:
  - 1 LA Program operating at 2 sites, with shared LAs and common Teaching and Learning seminar
- Ongoing:
  - LA program at CSUSM
  - Many student support roles at Palomar, all supported by seminar

PHYSICS SPECIFIC LINKAGES & OTHER PROGRAMS

- Student-Student
  - Joint Rocket Car Races @ 4-yr
  - Year-end celebrations
- Faculty-Faculty
  - Physics-specific joint professional development
- Bridges Program

ADMINISTRATIVE PARTNERSHIPS

- Connections between administrators through advisory boards
- Monthly lunch meetings between PI's on each campus along with regular communications on outcomes
- Continuous effort to seek joint funding opportunity to leverage each institutions specialty

EVALUATION APPROACH

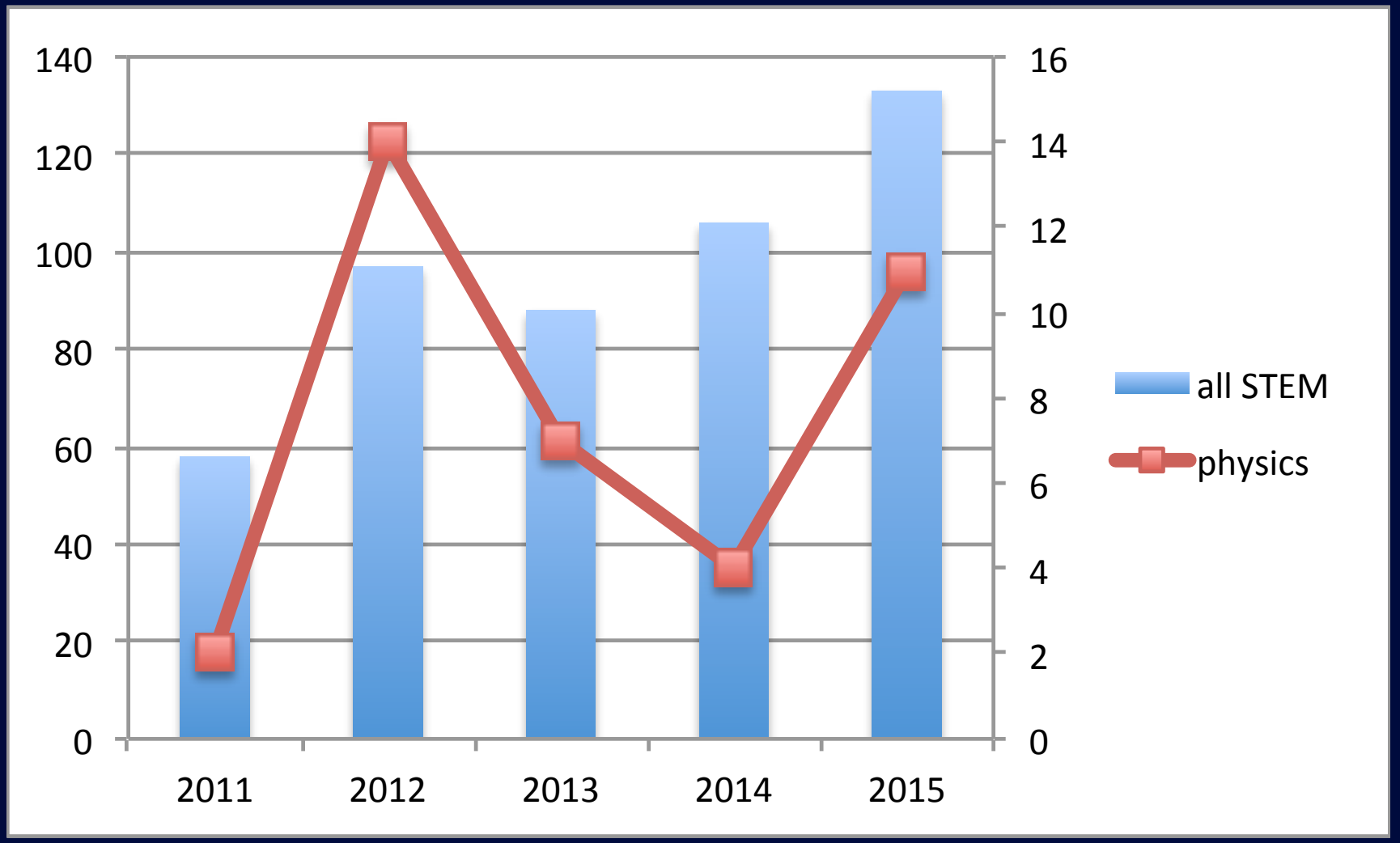
- Mixed Methods Research Design
- Quantitative metrics: tracking overall changes in progress toward degrees, growth in STEM majors, and increases in transfers
- Qualitative approaches: interviews and surveys of faculty, administrators, and students

RESULTS AND FINDINGS

- ALPS participants reported positive impacts on their professional learning, access to teaching resources, and skill development
  - *"I have more familiarity with and a better understanding of how similar their curriculum is to ours. I could help convey to our students that it will be highly similar when they get there and point out where there might be some subtle differences and to help smooth their transition." - Palomar ALPS Participant*
- Measurable increases in STEM transfers and degrees granted

RESULTS AND FINDINGS CONT'D

Increases in Palomar to CSUSM STEM and Physics x-fers as function of time



CONCLUSIONS

- Multi-level (administrative, faculty, and student) partnerships between two-year and four-year colleges can provide meaningful support for students who take varied pathways to STEM degrees
    - Leadership turnover can be a challenge!
- Formal elements and relationships are both essential and take time to build
- Undergrads can support peers and benefit while doing so
- External support can be a a powerful catalyst for such partnerships