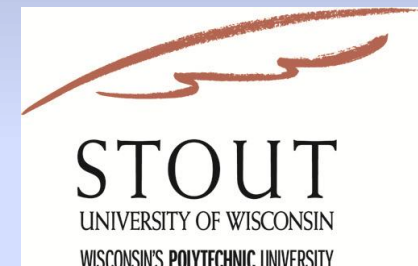


# Opening the *Portals of Discovery*-- Increasing opportunities in STEM through Collaborative Research



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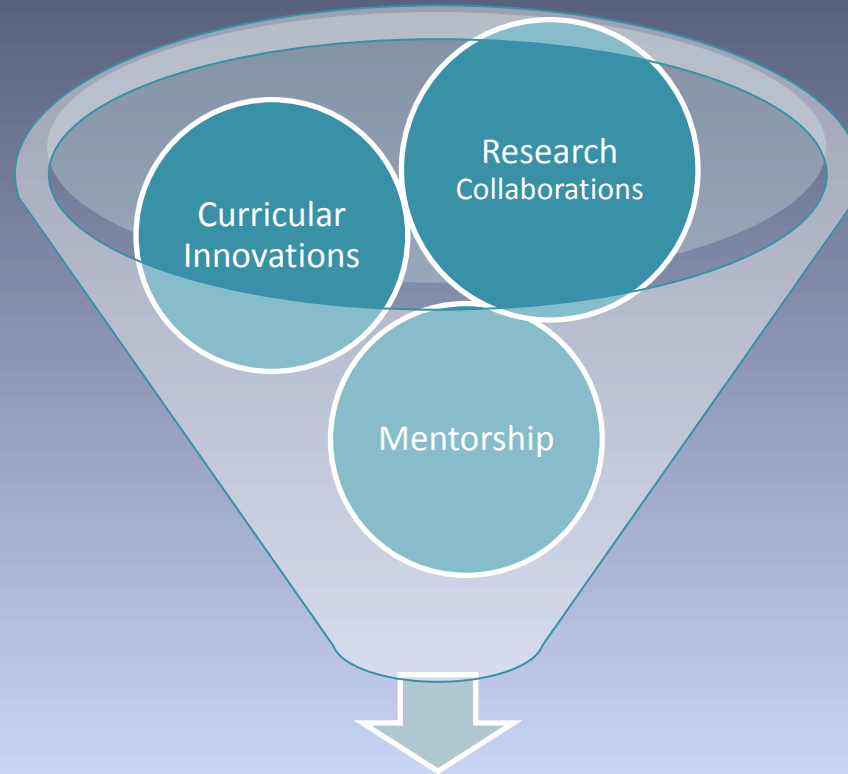
# How can we increase access and success for STEM students???

- Increase opportunities for new and existing pools of students
- Provide a strong foundation
- Improve retention and graduation rates



# The *Portals of Discovery* Model

- NSF STEM Talent Expansion Program (NSF-STEP)
- 2+2+2 pipeline:



Recruitment and Retention of Talented and Underrepresented Students



# Model for a Pipeline of STEM Education

High School



2 year campus



4 year campus

## Program Activity:

### *Collaborative Research Experience*

- Incorporation of original research into high school curriculum
- Recruitment through Upward Bound Summer Science camp

## Outcomes:

### *Short Term*

- Increased engagement and achievement in STEM courses<sup>1\*</sup>
- Introduction to STEM careers
- Articulation of students from H.S. to 2 year STEM program<sup>2\*</sup>

### *Long Term*

- Institutionalization of support system for underrepresented and students in STEM<sup>1\*</sup>
- Increased number of students moving into STEM program at 2-year campus<sup>2\*</sup>

## Program Activity:

### *Collaborative Research Experience*

- Portals of Discovery Summer Workshop
- Summer Research Internships at four year campus

### *Academic Support*

- Peer Mentors and Tutors
- LEC 100/First Year Experience

## Outcomes:

### *Short Term*

- Growing confidence in STEM abilities
- Development of technical skills<sup>1\*</sup>
- Establishment of peer-mentor network
- Establishment of faculty-mentor network

### *Long Term*

- Increased articulation of students from two year campus to four year campus<sup>1\*</sup>
- Retention of students in STEM fields<sup>2\*</sup>

## Program Activity:

### *Collaborative Research Experience*

- Students serve as peer mentors to High School and 2 year students

### *Expansion Outside Model*

- Collaborations Workshop for H.S. and college faculty
- "Pump Priming" funding for proposed 2 year/4 year collaborations

## Outcomes:

### *Short Term*

- Dissemination of collaboration "concept" to other UW campuses<sup>3\*</sup>

### *Long Term*

- Increased number of STEM graduates in state of WI<sup>2\*</sup>
- Dissemination of collaborative undergraduate research in peer-reviewed publications
- Numerous state-wide 2-4 year collaborations in place<sup>3\*</sup>

\*refers to corresponding evaluation question in evaluation plan

# Entry into the Pipeline: High School Collaborations



- Key steps:

- Identify engaged partners
  - Manitowoc Lincoln High School
  - Valders High School
- Collaborative approach
  - *Not* top-down
  - H.S. partners identify best approaches

# Entry into the Pipeline: High School Collaborations



- Portals Model Collaboration

- Integration of research into the curriculum
  - Hmong Medicinal Plants project
- Summer workshop for high school students
  - UW-Manitowoc campus

# Entry into the Pipeline: Freshman– Sophomore Experience



## • Key steps

- Develop partnership with collaborating 4 year school
  - Research experiences driving factor
  - Mentorships
- Expose freshman and sophomore students to the nature of science
  - Classroom based integration
  - Independent research

# Entry into the Pipeline: Freshman– Sophomore Experience



## • Portals Model Collaboration

- Integrate research/nature of science into curriculum
  - LEC 100 (First Year Experience)
  - Inquiry based labs (UW-Stout partners)
- Independent Research Cohorts
  - 4 UW-Manitowoc student assistants
  - Foundation of research skills
  - Peer-near peer-faculty mentors

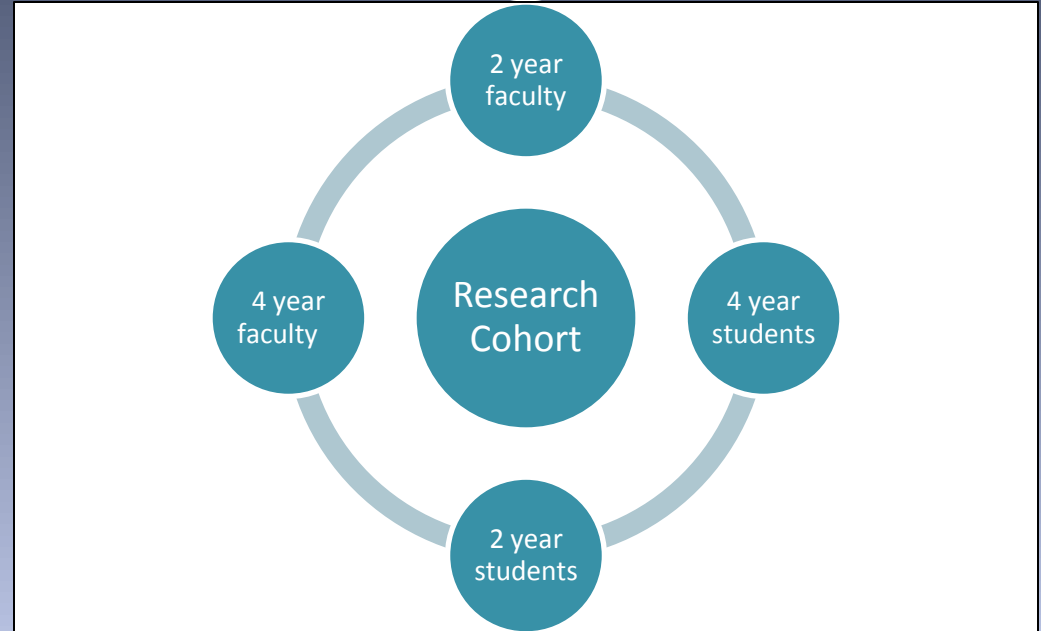


# Retention to STEM degrees: 2 year-4 year collaborations



## • Key steps:

- Identify collaborators
- Develop a research project
- Define research team roles



# Retention to STEM degrees: 2 year-4 year collaborations



## Collaboration across distances

- Videoconference network
  - Meetings
- Adobe Connect Pro
  - Joint lab meetings:

<http://extendlms.ics.uwex.edu/p51401151/>



<http://www.uwex.edu/ics/extendlms/>



# Retention to STEM degrees: 2 year-4

## year collaborations



- Preparation for transfer:
  - PODS pilot: Summer Internship Program
- How can this be adapted?
  - What resources are already available?
  - What networks can be built?



# Expanding the *Portal*: key concepts

Creating a seamless pipeline of STEM education

Increasing students' hands-on experiential education

Creating teams of faculty and peer mentors

Targeting talented and underrepresented populations of students

