Central Indiana STEM Talent Expansion Program (CI-STEP): Transforming Education

Kathleen A. Marrs, Associate Dean†
Jeffrey X. Watt, Associate Dean†
Andy Gavrin, Chair, Department of Physics †
Charlie Feldhaus, Associate Professor*
Stephen Hundley, Associate Dean *
Mariah Judd, Postdoctoral Fellow †
Howard Mzumara, Planning and Institutional Improvement

†Purdue School of Science, IUPUI
*Purdue School of Engineering & Technology, IUPUI
“STEP seeks to increase the number of students (U.S. citizens or permanent residents) receiving **associate or baccalaureate degrees** in established or emerging fields within STEM.”

“... STEP Type 1 activities should be aimed at adapting and implementing best practices that will lead to an increase in the number of students (U.S. citizens or permanent residents) obtaining STEM degrees.”

“The goal of the project must be to **increase the total graduation numbers** of such students at the institution.”

“The proposal must include specific numerical targets for these increases.”

“A project cannot focus efforts to increase the graduation numbers at the expense of degrees in other STEM fields.”
President McRobbie’s State of the University address on September 28, 2010 stated that one of the highest priorities of the university is to retain and graduate a higher percent of its students on all of the IU campuses.

September 2011, state-wide priority set to improve college graduation rates. “Changes are needed, especially when it comes to remediation” Complete College America Senior VP Cheryl Orr

The President’s Council of Advisors on Science and Technology (PCAST) found in 2012 that economic forecasts point to a need for producing, over the next decade, approximately 1 million more college graduates in STEM fields than expected under current assumptions.

Goals of CI-STEP is directly aligned with all of these priorities.
QUESTION

• What is preventing us from graduating more STEM students?

• Are we doing enough to see the change that PCAST is calling for (1 million additional STEM graduates over 10 years)?
IUPUI CI-STEP

- National Science Foundation, awarded September 2010, $1.99 M
- “STEP seeks to increase the number of students receiving associate or baccalaureate degrees in established or emerging fields within STEM.”
- CI-STEP at IUPUI is creating a central Indiana pipeline to increase the number of students obtaining STEM degrees of all demographic groups who:
  1. pursue STEM academic and career pathways;
  2. participate in STEM research, internships, and honors activities;
  3. graduate with an undergraduate degree in STEM fields; and
  4. transition into industry, graduate and professional programs.
- “... STEP Type 1 activities should be aimed at adapting and implementing best practices that will lead to an increase in the number of students (U.S. citizens or permanent residents) obtaining STEM degrees.”
Our proposal aims to 'set the stage' for student success, removing barriers to learning and promoting a vision of a career in STEM. As a result, we are targeting for each year of the funding, a:

- 10% increase in the number of new and transfer students admitted to STEM majors,
- 10% increase in the number of minority students admitted to STEM majors
- 10% decrease in the DFW rates for MATH, CS, PHYS, TECH and other courses
- 15 additional students participating in internship and research experiences
- 50 graduating seniors participating in honors seminars

17 departments in the School of Science and School of Engineering & Technology

Overall: The program has set a target of increasing the number of STEM graduates at IUPUI by 10% per year -- an additional 782 STEM graduates by 2015, for a total of 3,067 STEM graduates by 2015.
As of last March (2011) a milestone was reached, 30.4% of people over age 25 in the United States held at least a bachelor’s degree, up from 26.2% 10 years earlier.


Newly-formed Indiana College Completion Council has goal to raise Hoosiers with college credential to 60% by 2025.

- Inside Indiana Business Feb 20th
QUESTION

- What are the benefits of timely graduation?
- What is IUPUI doing to reach this milestone?
- Is 60% too ambitious?
# THE TARGETED STEM DEPARTMENTS

<table>
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<tr>
<th>STEM Program</th>
<th>F08 Direct Admits</th>
<th>F08 Transfers</th>
<th>F08 Total Majors</th>
<th>F08 Minorities</th>
<th>08-09 Graduates</th>
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<tbody>
<tr>
<td>Sci – Biol, Chem, Geol, Phys</td>
<td>386</td>
<td>46</td>
<td>885</td>
<td>223, 25%*</td>
<td>123</td>
</tr>
<tr>
<td>Tech – EE, CM, CP, ME, CI, BM</td>
<td>55</td>
<td>108</td>
<td>967</td>
<td>230, 28%^</td>
<td>184</td>
</tr>
<tr>
<td>Engr – EE, ME, CPE, BME, MS</td>
<td>102</td>
<td>91</td>
<td>808</td>
<td>285, 38%^</td>
<td>110</td>
</tr>
<tr>
<td>Math – MA, CS</td>
<td>48</td>
<td>15</td>
<td>223</td>
<td>42, 19%*</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>591</strong></td>
<td><strong>260</strong></td>
<td><strong>2,883</strong></td>
<td><strong>780, 29%</strong></td>
<td><strong>457</strong></td>
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</tbody>
</table>

* Includes AA, Hisp/Latino, and Native American students, excludes Asians and females.

^ Includes AA, Hisp/Latino, Native American and female students, excludes Asians.

**Goal**: 10% increase each year from **457 in baseline → 782 STEM graduates**
In 2008, the IUPUI undergraduate student population was: 
46% FT/FT, 23% transfer, 12% returning adults, 9% non-degree, 
7% inter-campus transfer, 2% FT/FT international, and 1% all other.
4 major categories of initiatives:

- Student Centered Pedagogies
- Career Services
- Student Success
- Articulation with Ivy Tech

For each initiative:

- Major research and education activities.
- Major findings resulting from these activities.
- Opportunities for training, development and mentoring.
- Opportunities for outreach activities.
- STEM Faculty Courses
- Transformation grants
- Expansion of PLTL, JiTT, Peer Mentoring

Students engaging in Peer Lead Team Learning

Students working on new microscopy lab

- Honors Seminars
- STEM Mentoring Programs
- STEM Summer Bridge

STEM Summer Bridge 2011. IUPUI student mentors with their mentees

2011-2012 Women in Science House (WISH) cohort

- Student-Centered Pedagogies

- Student Success

- Career Services

- Articulation with 2 yr. Colleges

- New CI-STEP Internship Program
- New School of Science Career Development Services

Proud student presenters at the 2011 STEM Showcase

Math Professor Jeffrey Watt giving math students one on one attention

- New Mathematics Courses
- Collaboration with Bridges to the Baccalaureate
- Revised Articulation with Department of Engineering and Technology
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<th>Title</th>
<th>Investigators</th>
<th>Goal</th>
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<td>Student Video STEM Projects</td>
<td>Andres Tovar and Randy Newbrough</td>
<td>Begin to develop video repository for students learning process to improve performance, retention and persistence to degree.</td>
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<tr>
<td>Summer Industrial Projects Program</td>
<td>Robert Durkin</td>
<td>Rekindle Soph/Jr. MET students' desire to become engineers, promote retention and persistence.</td>
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<td>Develop a Rigorous Two-Year Mathematics Degree</td>
<td>Janet Dalzell</td>
<td>Have 5 students complete their degree by 2013.</td>
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<td>Engineering and Technology Alliance for Retention for Multicultural Students</td>
<td>Patrick Gee</td>
<td>Raise GPAs. Increase minority retention and accelerate time to graduation.</td>
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<td>Transfer Student Recruitment and Support</td>
<td>Terri Talbert-Hatch</td>
<td>Teach a learning community at IVYTech. 20 students in June for 1.5 day orientation to increase retention.</td>
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<td>Using the Inductive Learning Methodology to Reduce Student Failure Rates in MET</td>
<td>Paul Yearling</td>
<td>Reduce DFW rates in the course Intro to Thermodynamics and Heat Transfer.</td>
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<td>From Studio to Student: e-Mentoring in Computer Graphics Technology</td>
<td>Jan Cowan and Dan Baldwin</td>
<td>Attract, retain new and existing students.</td>
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<tr>
<td>Exploring the Causes and Involving Faculty in Persistence</td>
<td>Barbara Christe</td>
<td>Alter instructors behaviors and attitudes.</td>
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<td>Improving the Retention of Freshman Engineering Students through Proactive Peer Mentoring</td>
<td>Stanley Chien</td>
<td>Increase freshman engineering retention by at least 12%.</td>
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<td>Promoting STEM Course via Introductory Videos</td>
<td>Sohel Anwar</td>
<td>Recruit students.</td>
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<td>Enhancing Student Comprehension and Success in Genetics through Recitation</td>
<td>Mariah Judd and Brittney Reese</td>
<td>Retain students.</td>
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<td>Organic Chemistry Workshop Series</td>
<td>Rob Minto, Ryan Denton and Sarah Wilson</td>
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<td>Creating a Physics Learning Space</td>
<td>Andy Gavrin</td>
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NEXT ROUND OF MINI GRANT PROPOSALS

- Identify area of need that meets one of the goals of the grant
- Visit website for guidelines and deadlines on active Request For Proposals (RFP)
- Write proposal; including project/activity description, evaluation plan, budget and how the proposal helps met the goals of the grant

www.step.iupui.edu
# CI STEP Project: Two-Phase Assessment Framework

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<td>Advanced Studies Pursued in STEM fields</td>
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<td>Attendance / User Sign-up Sheets</td>
<td>Career or Job Placements in STEM fields</td>
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IUPUI Math Minors Awarded per Year

- **Science**
- **Technology**
- **Engineering**
- **Computer Science**
- **Other**
- **Total**

* * Start of grant. 2008 was baseline year.
IUPUI STEM Graduates by Year

* Start of grant. 2008 was baseline year.
By achieving a 10% increase per year, the increase in degrees, over 5 years, will result in almost 800 additional STEM degrees during the course of the grant.

In 2011, the number of STEM graduates was on track to achieve the goal of 10% increase.

13 Mini-grants have been granted to date. More mini grants campus-wide will aid in the attainment of the goals. The second RFP should go out by Summer 2012.
DISCUSSION and QUESTIONS

Contact:
Jeff Watt jwatt@iupui.edu,
Kathy Marrs kmarrs@iupui.edu,
Mariah Judd juddm@iupui.edu,
Charlie Feldhaus cfeldhau@iupui.edu,
Stephen Hundley shundley@iupui.edu,
Andy Gavrin agavrin@iupui.edu,
Howard Mzumara hmwzumara@iupui.edu

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DISCUSSION PROMPTS

- Are we helping our students reach graduation?

- Are you (and your colleagues) doing all you can to help IUPUI meet their mission of increasing graduation rates and reducing attrition?

- What efforts can you make to help contribute to the call for 1 million additional graduates? Do you have an idea that CI-STEP could help with?