Internal Advisory Board Meeting

Central Indiana STEM Talent Expansion Program CI-STEP

Thursday, September 30, 2010
11:00 am to 1:00 pm, SL 306
Uday Sukhatme - Introductions

- Members of the CI-STEP Internal Advisory Board
- Members who RSVP Regrets:
  - John DeCoursey, Math, Vincennes
  - Scott Evenbeck, University College, IUPUI
  - Terri Talbert-Hatch, SoET, IUPUI
  - Nancy Lamm, SoET, IUPUI
- Guests
- Principal and Senior Investigators
Jeff Watt - Synopsis of NSF STEP Program

- “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.”

- Type 1 Proposals: provide full implementation efforts at the academic institution.

- Type 2 Proposals: provide support for educational research projects on degree attainment in STEM.

- CI-STEP is Type 1.
The Goal of NSF STEP

- “... 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.”
Priority of Indiana University

During President McRobbie’s State of the University address on September 28, 2010, he stated that one of the highest priorities of the university in the coming years is to retain and graduate a higher percent of its students on all of the IU campuses.

“....Last year, IU achieved a record fall enrollment of 107,000 students on all campuses and a record of 102,000 students in the spring. This fall, we surpassed those numbers with a new record total of 109,000 students, breaking records on nearly every campus, including a 15% increase in enrollment at IU East. Enrollments of minority students have steadily increased over recent years as well,...

But numbers are not enough—even of the best students—if they do not graduate. Our mission, after all, is graduation and not enrollment. The words of industrial production—often misapplied or simplistically applied to the academic enterprise—are apt here: we must focus on our outcomes and not only on our input. We must, in short, seek to enhance undergraduate student learning and success through university-wide efforts to address retention and graduation issues in a systematic, sustained fashion ...

The goal of this grant is directly aligned with the current priority of the campus.
Central Indiana STEM Talent Expansion Program (CI-STEP) Goals

CI-STEP at IUPUI is creating a central Indiana pipeline to increase the number of students from central Indiana obtaining STEM degrees. The goals of this project are to increase the numbers of students of all demographic groups who:

(1) pursue STEM academic and career pathways;

(2) participate in STEM research, industry internships, and honors activities;

(3) graduate with an undergraduate degree in STEM fields; and

(4) transition into industry, graduate and professional programs.

The program has set a target of increasing the number of STEM graduates at IUPUI by 10% per year (an increase of an additional 782 STEM graduates by 2015).
The Target for STEM Graduation Numbers at IUPUI

<table>
<thead>
<tr>
<th></th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>Yr 4</th>
<th>Yr 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline # of students graduating</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>457</td>
<td>2,285</td>
</tr>
<tr>
<td>Increase in # of students graduating</td>
<td>45</td>
<td>95</td>
<td>151</td>
<td>212</td>
<td>279</td>
<td>782</td>
</tr>
<tr>
<td>Total # of students graduating</td>
<td>502</td>
<td>552</td>
<td>608</td>
<td>669</td>
<td>736</td>
<td>3,067</td>
</tr>
</tbody>
</table>

- 2008-09 was the baseline year, the total number of STEM graduates was 457.
- CI-STEP proposes to increase this number 10% per year during the grant period.
- The goal is to graduate 736 students in the year 2014-15.
- This increase will be distributed over 17 departments in the Schools of Science, Engineering, and Technology at IUPUI, which currently enrolls 2,883 students in these 17 departments.
The Targeted STEM Departments

<table>
<thead>
<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>
</tr>
</thead>
<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>
</tr>
</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.
Kathy Marrs - Profile of Students and Challenges Facing the STEM Talent Gap at IUPUI

<table>
<thead>
<tr>
<th></th>
<th>IUPUI SoS</th>
<th>IUPUI SoET</th>
<th>IUPUI Total</th>
<th>IUBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours employed</td>
<td>23.8 hr/wk</td>
<td>30.3 hr/wk</td>
<td>25.8 hr/wk</td>
<td>7.2 hr/wk</td>
</tr>
<tr>
<td>% of new students that are FT</td>
<td>83%</td>
<td>53%</td>
<td>69%</td>
<td>96%</td>
</tr>
<tr>
<td>% in top 10% of HS class</td>
<td>43.6%</td>
<td>28.8%</td>
<td>17.9%</td>
<td>31.2%</td>
</tr>
<tr>
<td>1-yr retention rate of FT/FT</td>
<td>79%</td>
<td>75%</td>
<td>68%</td>
<td>90%</td>
</tr>
<tr>
<td>6-yr graduation rate</td>
<td>45.9%</td>
<td>29%</td>
<td>32%</td>
<td>73%</td>
</tr>
<tr>
<td>Undergraduate degrees awarded to total number of undergrads in unit</td>
<td>163 / 1,108 (14.7%)</td>
<td>294 / 1,775 (16.6%)</td>
<td>3,356 / 21,423 (15.7%)</td>
<td>6,352 / 31,626 (20.0%)</td>
</tr>
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</table>

In 2008, the IUPUI undergraduate student population was:
46% FT/FT non-international, 23% transfer, 12% returning adults, 9% non-degree, 7% inter-campus transfer, 2% FT/FT international, and 1% all other.
Profile of Students and Challenges Facing the STEM Talent Gap at IUPUI

<table>
<thead>
<tr>
<th>Course</th>
<th>N</th>
<th>%DFW</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL K101</td>
<td>595</td>
<td>28.6</td>
</tr>
<tr>
<td>CHEM C105</td>
<td>869</td>
<td>22.3</td>
</tr>
<tr>
<td>CSCI 230</td>
<td>157</td>
<td>32.5</td>
</tr>
<tr>
<td>ENGR 196</td>
<td>273</td>
<td>09.2</td>
</tr>
<tr>
<td>PreCalc 153</td>
<td>1219</td>
<td>57.8</td>
</tr>
<tr>
<td>Calculus 165</td>
<td>510</td>
<td>37.8</td>
</tr>
<tr>
<td>PHYS 152</td>
<td>297</td>
<td>36.0</td>
</tr>
<tr>
<td>TECH 104</td>
<td>168</td>
<td>47.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SoS 6-yr Grad</th>
<th>SoET 6-yr Grad</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT – Total</td>
<td>30%</td>
<td>18%</td>
</tr>
<tr>
<td>PT – Minority only</td>
<td>24%</td>
<td>--</td>
</tr>
<tr>
<td>FT – Total</td>
<td>60%</td>
<td>64%</td>
</tr>
<tr>
<td>FT – Minority only</td>
<td>50%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Andy Gavrin - Stem Activities

- **Alphabet Soup 101:**
  - NSF’s suggested STEP program activities
    - Just-in-Time Teaching (JiTT)
    - Peer-led Team Learning (PLTL)
  - Themed Learning Communities (TLCs)
  - Summer Bridge Academy
  - Honors College
  - Inter-campus activities (full discussion next meeting)
<table>
<thead>
<tr>
<th>NSF Suggested Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Activities focusing on quality learning: enhancing faculty time on teaching; new pedagogical approaches; training of teaching assistants, etc</td>
</tr>
<tr>
<td>• Expanding capacity to incorporate current advances in STEM</td>
</tr>
<tr>
<td>• Interdisciplinary approaches to undergraduate STEM education</td>
</tr>
<tr>
<td>• Bridge programs</td>
</tr>
<tr>
<td>• Enabling CC students to matriculate directly into BS/BA STEM programs</td>
</tr>
<tr>
<td>• Increasing pathways to STEM degrees, improving articulation among programs at partner institutions.</td>
</tr>
<tr>
<td>• Mentoring programs that involve faculty or peer students mentoring.</td>
</tr>
<tr>
<td>• Expanding student exposure to potential careers: co-ops; part-time employment; undergraduate research opportunities.</td>
</tr>
<tr>
<td>• Financial incentives to students entering and persisting in the study of STEM.</td>
</tr>
</tbody>
</table>
Just-in-Time Teaching (JiTT)

- Developed in Physics by A Gavrin, G. Novak, others
- Pedagogical Method
- Uses WWW-based homework to leverage student’s time
- Feedback between Homework and class
- Example: Class meets Wednesday at 11 AM to discuss Magnetic fields
  - Monday night, Sasha does reading on magnetic fields in text
  - Tuesday night Sasha completes online “Warmup Exercise”
  - Wednesday 9 AM Gavrin reads Sasha and other students work
  - Wednesday 9:30 AM Gavrin adjusts plans “Just in Time” for class
  - Wednesday 11:00 class discusses mag fields based on their own prior work.
Peer-led Team Learning (PLTL)

- Developed in Chem. By P. Varma-Nelson et al
- Students work in groups of 6-8 ("Workshops")
- Groups facilitated by Peer Leaders
- Peer leaders trained and supervised by faculty
- Engaging workshop materials
Themed Learning Communities (TLCs)

- Freshman enroll in multiple courses as a block
- 2-3 disciplinary courses plus First Year Experience course
- Instructional team: faculty members plus librarian, student mentor, academic advisor
- Integrated curriculum, some overlapping assignments
- Themes may be career oriented: Education, Nursing, Health Professions
- Themes may be interest oriented: “Health and Wellness”, “African American Perspectives”
- May be combined with Summer Bridge
- 33 TLCs this semester ~800 students
Summer Bridge Academy

- Serves incoming Freshman 1-2 weeks in late summer
- Academic preparation/evaluation in math, critical reading and writing
- Orientation to campus, university culture
- Academic habits: note taking, time management, test-taking
- Community building
- 20 sections this summer, ~440 students
Honors College

- New this year
- Smaller, more challenging classes
- Emphasis on research
- Close collaboration with faculty
- Individualized majors available
- Living community – “Honors House”
- Merit-based aid programs
Inter-Campus Programs

- More details next meeting
- IUPUI ITCC Coordinated Programs
- Bridges to the Baccalaureate
- IUPUI-ITCC articulation agreements
- IUPUI-Butler Engineering Dual Degree Program (EDDP)
Jeff Watt – Highlights, NSF STEP’s PI Meeting

- CI-STEP must report results in 2nd year (for the first time).
- STEP was authorized by Congress in 2002, unused funds and results are returned/reported back to Congress.
- Primary focus must be on recruit, retain, and graduate US citizens in STEM.
- Innovation not necessary, NSF wants proven strategies to be adapted + adopted.
- Data is critical, NSF wants data driven changes.
- NSF wants to see strong institutional support for changes.
- NSF will support any shift of money in budget, except for reducing participant costs. Some proposed activities are not going to work, so shift funds to those that are showing results or try new activities.
- NSF encourages activities in the following categories: pre-college development/recruitment of juniors/seniors, undergraduate student academic development, undergraduate student professional development, faculty development, curriculum development, stronger linkages to CC and feeder schools.
Highlights of NSF STEP’s PI Meeting

- During 3rd year review, the Chair of the Internal Advisory Board must complete a report.

- Contributing to National Data Base – collect data in consistent ways.

- Must be careful not to double count students – double majors or between institutions.

- CI-STEP was singled out several times as being one of the most comprehensive proposals this year.

- Budgeting – use money to leverage change or additional funds, be flexible, use as incentives, feel free to allocate differently as changes occur.

- NSF is looking for formative and summative evaluations on project management, student behaviors, and institutional impact.
Steve Hundley - CI-STEP Activities and Participants

See Handout

Outreach and Recruitment Activities:

A: Project SEED was not funded

Transition Programs and Activities:

B: STEM Bridge Programs
C: IVYTech and Vincennes Programs
D: 2+2 Programs
E: EDDP Butler Programs

STEM Curriculum Activities:

F: Curriculum Development
G: Honors Programs

Student Services Activities:

H: Internships
H: Career Development
H: Placement Programs

Assessment Activities:
Approved Budget $1,991,855

- Personnel ($961,907)
  - 6 Senior – PIs, 3 mo each during 5 yrs
  - 1 Senior – Assessment, 10 mo during 5 yrs
  - 1/2 New Advisor for 2+2 for 5 yrs in SoET, $75k
  - 44 Other – Students/Mentors/Coordinators, $580k

- Travel ($19,000)

- Project SEED ($0)

- IUPUI Faculty Stipends ($30,000)

- Faculty Stipends/Consultants (non-IUPUI) ($57,500)

- STEM Bridge Program Development Faculty/Student Mentors ($60,000)

- Student Internships ($112,500)

- Materials/Supplies/Publications ($27,000)

- Fee Remissions ($89,700)

- 2 Day Conference/Workshop ($20,000)

- Project Assessment ($11,000)

- Indirect Costs (54%, not on fee remission) ($593,408)
CI-STEP Timeline of Activities

- See Handout.
Charlie Feldhaus – External Advisor Board Membership

“Type 1 proposals will be expected to establish an External Advisory Committee including 3 or 4 members from outside the project institution.”

Names that have been suggested include:
- Representative from IUPUI Talent Alliance?
- Representative from School of E/T Dean’s Industrial Advisory Council?
- John Haddock, University of Memphis – confirmed
- Brooke Huntington, Pres/CEO of Indy Private Industry Council – confirmed
- Betsy Barefoot, VP John Gardner Inst for Excellence in Education
- JP Mohsen, U of Louisville, Chair Civil Engr
- Mary Ostrye, VProvost IVYTech
- Terrel Rhodes, VP for Quality, Curriculum and Assessment Assoc of American Colleges and Universities
- Scott Evenbeck – chair.
Publicity and Dissemination

NSF STEP Press Releases – September 2010
Two Schools Awarded Federal Science Grants

The National Science Foundation is providing a $2 million grant to IUPUI and a $487,000 grant to Indiana State University. IUPUI will use the funding to boost the number of students graduating with bachelor's degrees in STEM, while ISU will award scholarships to eligible students pursuing degrees in engineering technology.

Source: Inside INdiana Business

InsideINdianaBusiness.com
IUPUI Receives $2 Million to Expand State, National Science and Technology Talent Pool

A $2 million grant from the National Science Foundation to Indiana University-Purdue University Indianapolis is targeted to boost the number of students graduating with bachelor’s degrees in science, technology, engineering and mathematics by 10 percent.

The funding is designed to encourage more students, including those who begin their college education in a local community college, to embark on careers in science, technology, engineering and mathematics (STEM) and to provide those students with the support needed to achieve this goal. With this award, IUPUI hopes to increase STEM degrees to an additional 782 undergraduates by 2015.

Retention and persistence to graduation are particularly challenging for STEM students at urban universities such as IUPUI that enroll a diverse blend of students, including first generation college students, full and part-time students, and older students, as well as a growing number of traditional students. Many begin their studies at a community college that may lack courses necessary to prepare for a STEM major.

Published:
September 27, 2010
The IUPUI School of Science attracts leading scholars from 27 states and 38 countries. Forbes magazine recently ranked IUPUI as eighth in quality for Midwest public universities.

IUPUI Receives $2 Million to Expand State, National Science and Technology Talent Pool

Release Date:
Sep 24 2010

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“STEM students and students who initially trained in non-STEM fields but are considering a change in trajectory tend to hit roadblocks that those majoring in other disciplines may not encounter — often lacking adequate math training or other technical competencies. And they often don’t get specialized career planning support targeted to those interested in STEM fields,” said Jeffery X. Watt, Ph.D., principal investigator on the NSF grant. Watt is associate dean for student affairs and associate professor of mathematical sciences in the School of Science at IUPUI.
Uday Sukhatme – Wrap Up

- Possible dates for Spring Meeting of this Board
  - Month, day of week, etc.

- Agenda Items for Spring Board Meeting:
  - Assessment Activities
  - Activities at non-IUPUI Institutions
  - Other recommendations?

- Further discussion, questions, etc. as time permits.