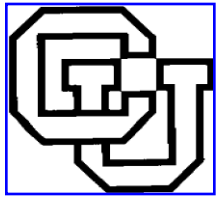


Several Things that CU is Doing to Make Engineering Education Attractive



**GoldShirt
Honors
Projects
EWB
Partnerships
Earn-Learn**

**Presentation at 40th Anniversary of CACHE on 8/8/09 by
Robert H. Davis, Dean, College of Engineering & Applied Science
University of Colorado at Boulder**

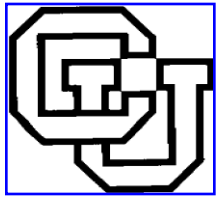


Background Statistics



Year	U.S. Pop	HS Grad	Coll. Deg.	Engr. Deg.
1983	234 M	2.89 M	0.97 M	72.7 K (7.5%)
2008	304 M	3.00 M	1.56 M	77.1 K (4.9%)
2020	341 M	2.99 M	1.73 M	?

- **Female ugrad engr: 18% vs 51% gen. pop.**
- **URM ugrad engr: 15% vs. 29% gen. pop.**

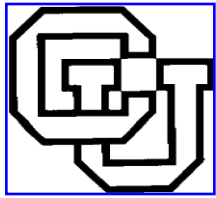


Engineering GoldShirt Program



- **5-year program for *underprepared* students**
 - summer bridge program
 - small sections of math, chemistry & physics
 - first-year engineering projects course
 - earn-learn or discovery-learning apprenticeships
- **High participation of *underrepresented* students**
 - 78% URM, 44% women,
61% first gen



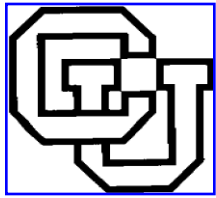


Engineering Honors Program



- **Attracts top students**
- **Strong retention tool**
 - 127 of 135 students still in program
 - 35% women
- **Enrichment & service**
 - one-credit supplements
 - research or industry experience
 - service and outreach





Engineering Projects Course

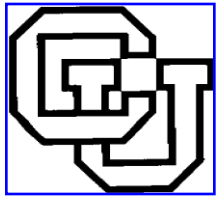


- **Most but not all first-year students**
- **Theme-based classes of 30 students**
- **Projects-based teams of 4-5 students**
- **Strong correlation with retention**

58% (nontakers) → 68% (takers), 7th semester



**Engineering
Design Expo**



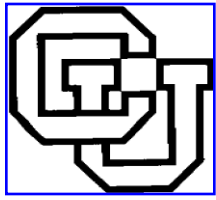
Engineers Without Borders



- **EWB USA founded 2001 by CU's Bernard Amadei**
- **Over 300 chapters, 12,000 members, 400 projects in 47 countries**
- **Mortenson Center in Engineering for Developing Communities (companion program in research, education & service)**



**Bernard Amadei
and friends in Mali**



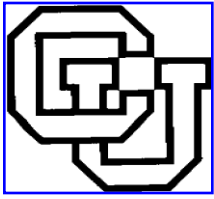
Partnerships with Regional Schools



- **Denver School of Science & Technology**
45% women, 65% URM, 40% low SES
- **TEAMS Programs in Lafayette & Longmont**
Avg 48% women, 38% URM, 35% SES
Pre-engineering & STEM academies
- **Mesa County in Western Colorado**



**K-12 engineering
education**



Earn-learn Program



➤ **Paid positions in the College**

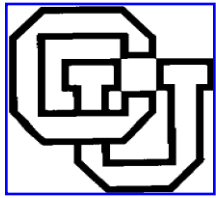
- course assistants
- department or program assistants
- K-12 outreach

➤ **Shared funding model**

- donors
- department/program



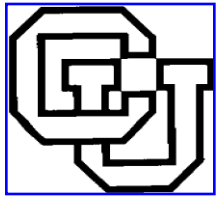
Earn-learn student



Conclusions



- **Programs aimed at increasing engineering enrollments and retention are expensive**
- **Return on investment?**
 - Earn-learn: win-win**
 - Honors: attracts top talent**
 - GoldShirt: improves access**
 - Projects course: early engagement**
 - EWB: good draw, hard to scale**
 - Partnerships: go deep, change culture**



Future of Engineering Education



- **Growth**
- **5-year degrees (?)**
- **Technology & change**

