



Broadening Participation in Computing

# Data Buddies: Partnering for Comparison Data

*a CRA-W/CDC Project*

**Betsy Bizot**

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*Presented at the Council of Graduate Schools 6/20/12*



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Broadening Participation in Computing

# BPC Alliance: Widening the Research Pipeline



Committee on the Status of **Women** in Computing Research

# Alliance Activities

CRAW CDC

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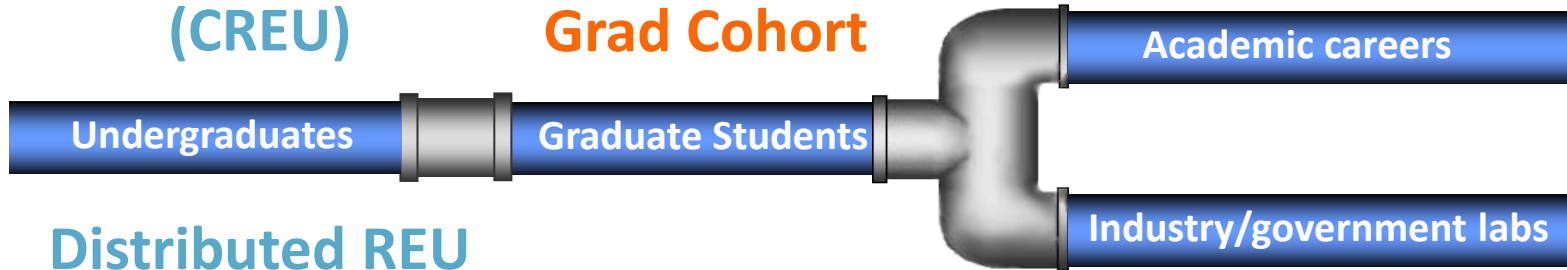
**Tapia Celebration**

**Sending Students/Mentors to Conferences**

**Collaborative REU  
(CREU)**

**CAPP**

**Grad Cohort**



**Distributed REU  
(DREU)**

**Career Mentoring Workshop**  
**Academic Workshop**

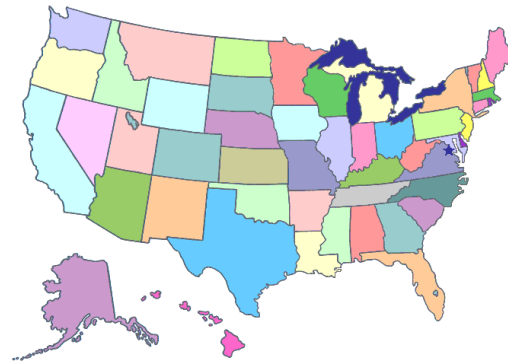
- ◆ Alliance
- ◆ CDC
- ◆ CRA-W

**Distinguished Lecture Series**  
**Discipline-Specific Mentoring Workshops**  
**Data Buddies/Evaluation**  
**Addressing the Shrinking Pipeline**  
**IEEE-CS Distinguished Visitors Program**

# CREU Numbers

**542** undergraduate URM+Ws across the USA have participated in CREU!

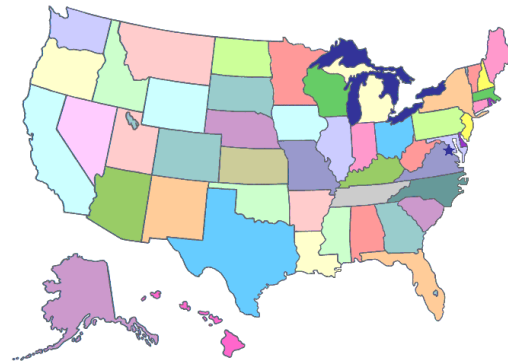
**223** CREU projects have been funded!



# DREU Numbers

**643** undergraduate URM+W students across the USA have participated in DMP/DREU!

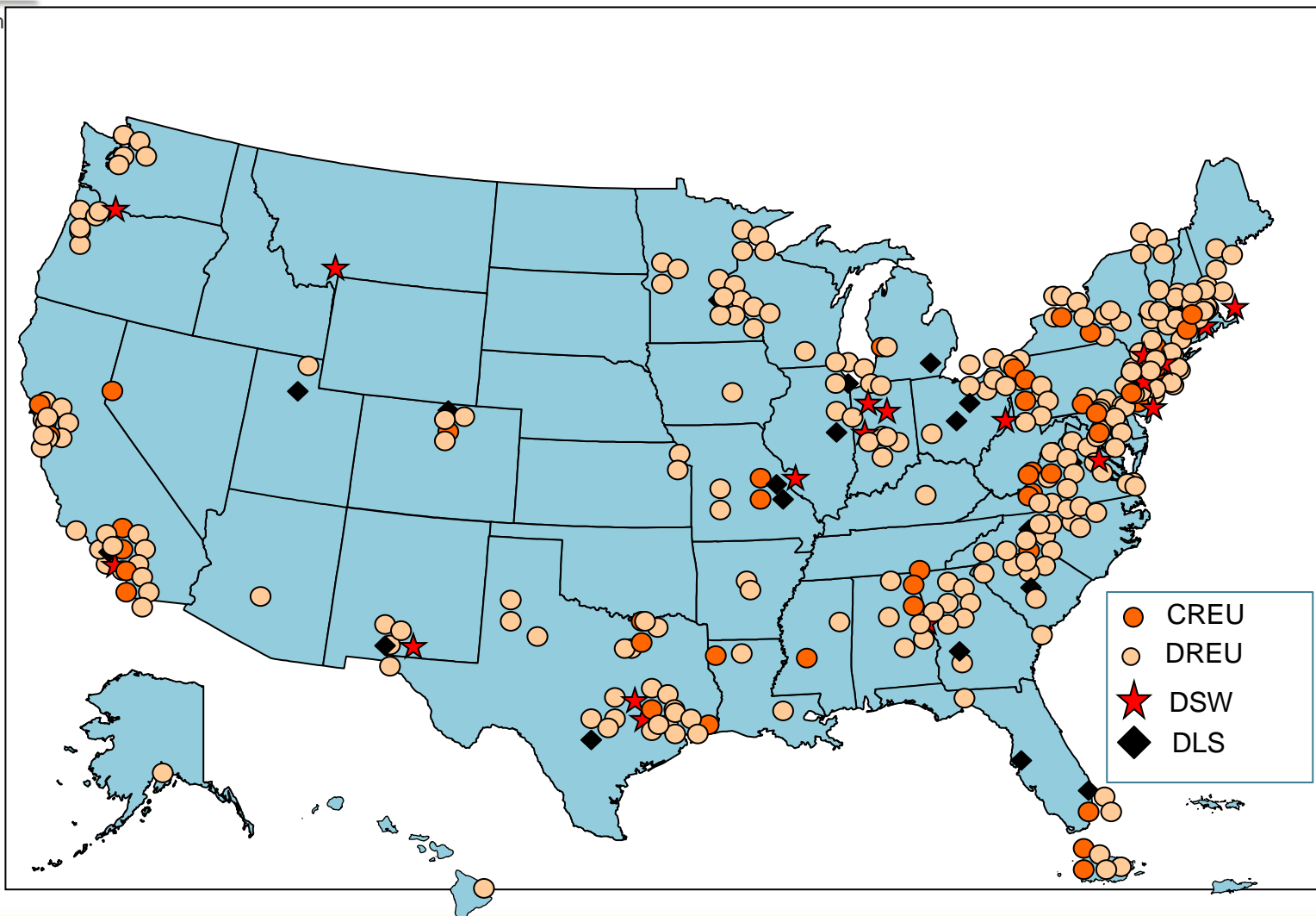
**96** research universities have hosted DMP/DREU students from **282** institutions!



# CRAW-CDC BPC Participants 2007-2011

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# What did we learn?

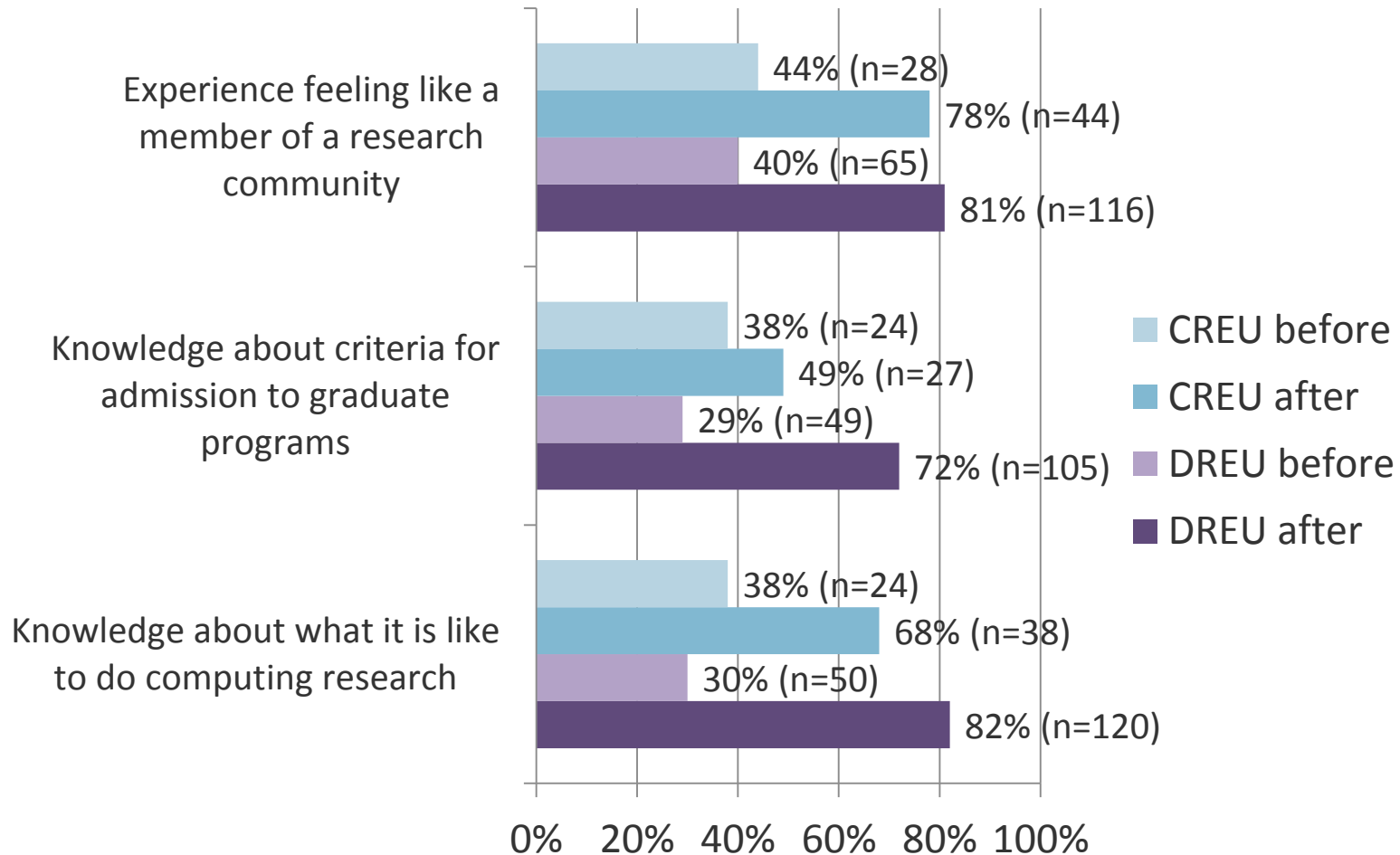
Learned that ~30-40% of CREU/DREU participants enrolled in graduate school (mainly Ph.D. programs)





# BPC CREU/DREU Evaluation (in program)

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# Are we spending our money wisely?



# Data Buddies: A Better Measure of Evaluation





# Why Data Buddies?

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- Our participants are nationwide
- Participants from many institutions come to us *as individuals*
- In theory, our comparison group is “all computing undergraduates in the US”



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# Sampling by Department

- Don't sample individuals, sample departments
- Then survey all students
- Starting point: departments from which participants came in 2008-2010
- Categorize by program type
  - Top-ranked PhD
  - Other PhD
  - Masters-only
  - Bachelors-only
- Then invite randomly





# Recruiting Departments

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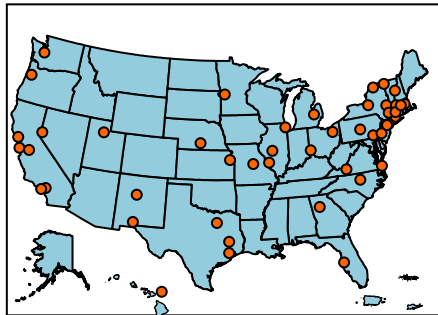
- **Reasons for them to participate**
  - Department report on responses of their students compared to programs of the same type
  - Department stipend
- **How they participate**
  - Contact person facilitates our surveys of students and faculty
  - Encourage individual participation

# Randomly Selected Departments: Spring 2011

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- **PhD Programs ranked 1-36 (8):**  
*Georgia Tech, Northwestern, Penn State, Stanford, UCLA, U Mass Amherst, UNC, Yale*
- **Other PhD Programs (13):**  
*Dartmouth, New Mexico State, Old Dominion, Syracuse, U of Kansas, Missouri-Columbia, Nevada-Reno, New Mexico, South FL, Texas at Dallas, Utah, Wash at St. Louis, Worcester Polytech*
- **Master's (8):**  
*CUNY Queens, Miami U-Oxford, St Joseph's, Texas Southern, U of Akron, Illinois-Springfield, Michigan-Flint, and Western Oregon*
- **4-year (17):**  
*Albany State, Cal State-Stanislaus, CUNY Hunter, Harvey Mudd, Kean, Millersville of PA, Radford, Sonoma State, SUNY Plattsburg and Potsdam, U Hartford, Hawaii-Hilo, Houston-Downtown, Minnesota-Morris, Nebraska-Kearney, Puget Sound, and Wellesley*





# Now what?

We have the departments and two years worth of valuable data...Now what?





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# Survey Content

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- Student experience in their department, with mentoring, with research, with professional networks
- Interest and confidence in continuing on a research track
- Highest intended degree
- For completing students, plans for the following fall

# Survey Responses

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Group	Spring 2011 (graduating)	Fall 2011 (continuing)
Departments	45	50
Undergraduate Students	706	2329
Graduate Students	555	1260



# Spring 2011: Graduating Students

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- **Participants**
  - Collaborative Research Experience for Undergraduates (CREU)
  - Distributed Research Experience for Undergraduates (DREU)
  - Grad Cohort
  - Career Mentoring Workshops
- **Non-Participants**
  - Recruited through Data Buddy Departments



# Spring 2011: Graduating Students

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- **Undergrad** participants more likely than non-participants to
  - Have applied to grad school in computing (51% vs. 23%);
  - Be attending grad school in computing in fall 2011 (39% vs. 19%);
  - Be enrolled in a PhD program if attending grad school (81% vs. 18%).



# Spring 2011: Graduating Students

Broadening Participation in Computing

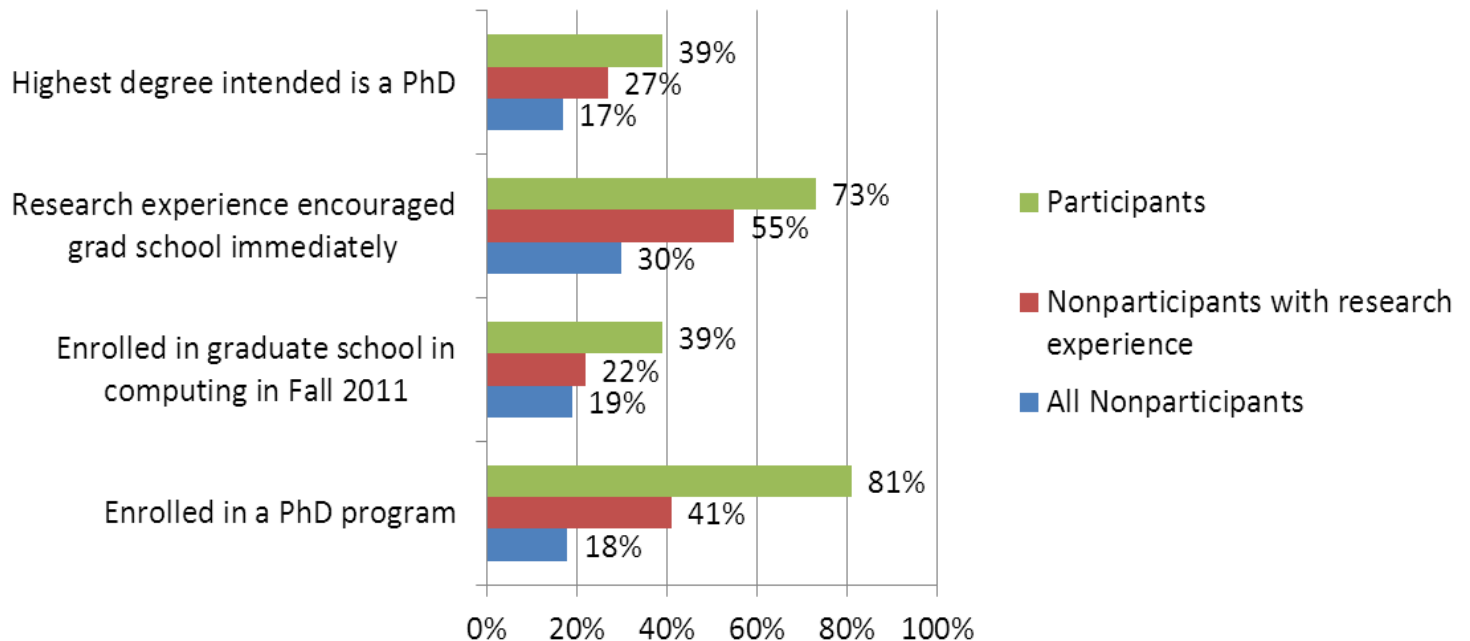
- **Undergrad** participants also more likely than non-participants to report
  - Having a research advisor as a mentor (41% vs. 24%);
  - Their mentor discussed grad school options with them (80% vs. 70%).

# Spring 2011: Graduating Students

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**Research Path Comparisons for CRA-W/CDC Program Participants and Nonparticipants**







# Spring 2011: Graduating Students

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- **Graduate (PhD)** participants appear to have stronger professional networks than non-participants
  - 87% report having *some* or *quite a bit* of knowledge about developing their professional networks
  - 71% served on departmental, conference or professional society committees during graduate career

# Data Potential

- Data collection efforts would yield results other than those arising from participant vs. non-participant comparisons.



# Why Students don't do Research

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- **Graduating** students did *not* participate in undergrad research for the following reasons
  - **All:** *no time*
  - **Women:** *not interested*
  - **URM:** *applied, but turned down*
  - **Non-URM:** *didn't pay well enough*



# Fall 2011: Continuing Students

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- **Undergrad** participants (compared to non-participants with research experience) more likely to attend or have attended national, regional and diversity conferences
  - **URMs** at Bachelor's degree granting institutions are less likely to participate in diversity conferences because they are unaware of their existence.



# Fall 2011: Continuing Students

Broadening Participation in Computing

- **Undergrad** participants (compared to non-participants with research experience) have more contact with computing professionals outside their home institution
  - National computing conferences
  - Diversity conferences
  - Networking/Mentoring workshops
  - Research Experiences for Undergraduates



# Fall 2011: Continuing Students

Broadening Participation in Computing

- **Graduate** participants served on more departmental, conference or professional society committees
  - 45% of **PhD** participants (vs. 28% of non-participants) served on at least one committee;
  - 43% of **Master's** participants (vs. 9% of non-participants) served on at least one committee.



# Fall 2011: Continuing Students

Broadening Participation in Computing

- **Graduate** participants attended more conferences than non-participants
  - Relative to other students within their grad program and at the same academic stage, **PhD** participants indicate attending an above average number of conferences



# Fall 2011: Continuing Students

Broadening Participation in Computing

- **Graduate (PhD)** participants more likely to maintain contact with people outside their home institutions they met at technical and diversity conferences
  - Email or social media
  - Ask technical questions
  - Develop friendships
  - Career options and advice
  - Gather information about internships, research opportunities, etc.
  - Offer advice or information about opportunities





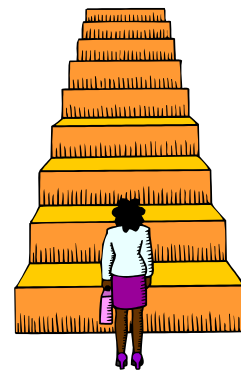
# Fall 2011: Continuing Students

Broadening Participation in Computing

- More frequently than non-participants, **Graduate** participants had more professional publishing experiences
  - **PhD** participants were authors or co-authors of conference papers
  - **Master's** participants had papers or presentations in progress

# Next Steps

- Continuation of surveys
  - Spring
  - Fall
  - Follow-up
  - Faculty
- In-depth analysis
  - More regression or ANOVA
  - Specific topic, e.g. REU experience
  - Multiple years: aggregate/longitudinal
  - ?





# Data Buddies Vision

Broadening Participation in Computing

- Potential as a resource for both the Computing and Broadening Participating communities
- Needs the resources to support it: how to make it sustainable
- Wealth of data: how to best partner with others on analysis

# For more information

- See [www.cra.org/databuddies](http://www.cra.org/databuddies)
  - Initial report on spring 2011 data collection
  - Sample department report
  - Information on being a volunteer department is there as well
- Or email [databuddies@cra.org](mailto:databuddies@cra.org)

**QUESTIONS?**