

Helping Students Engage and Thrive

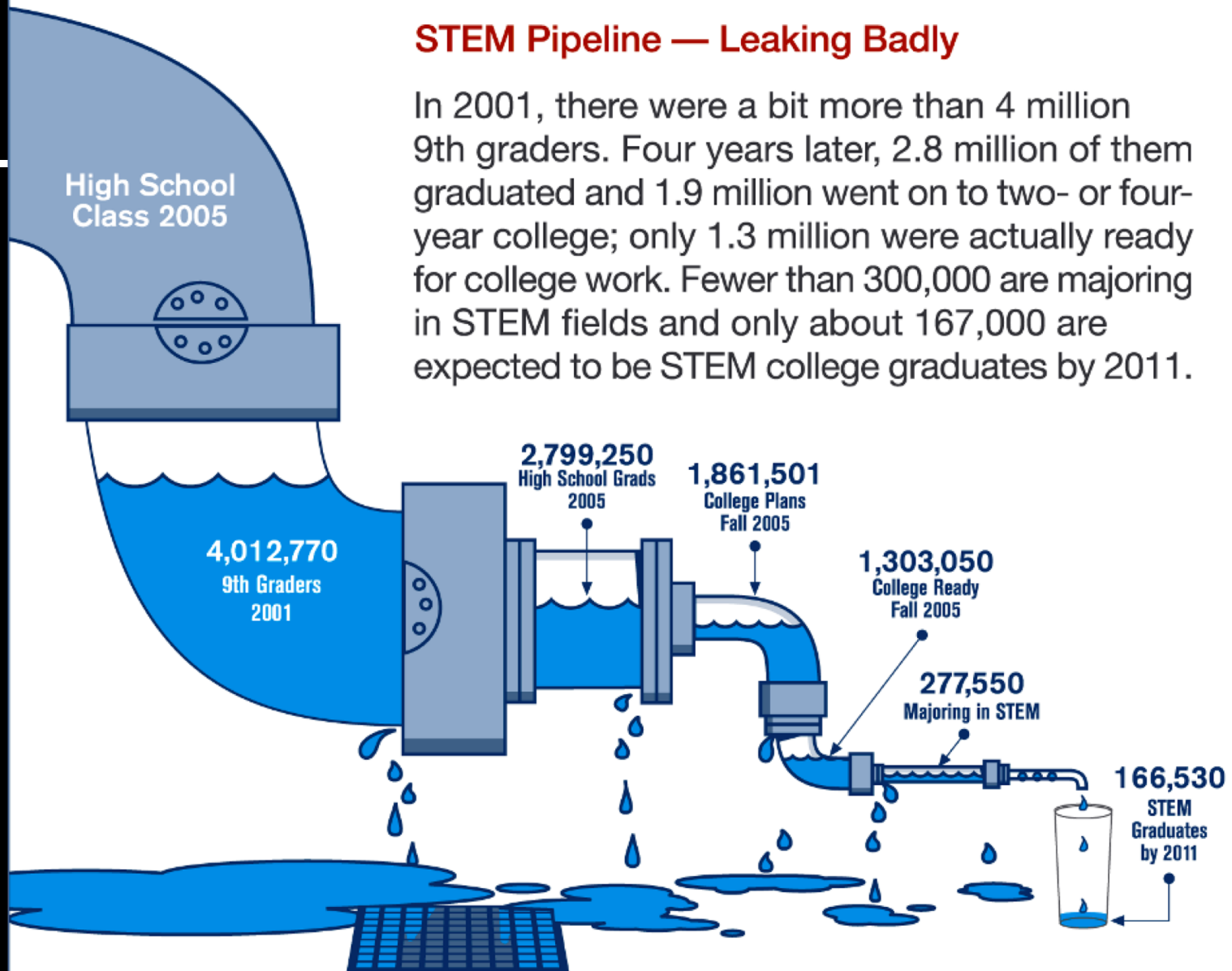
# Breaking Down Barriers to Student Success



Barbra Sobhani  
Fall 2017

## STEM Pipeline — Leaking Badly

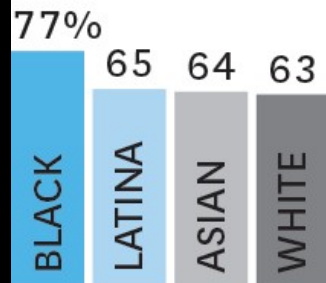
In 2001, there were a bit more than 4 million 9th graders. Four years later, 2.8 million of them graduated and 1.9 million went on to two- or four-year college; only 1.3 million were actually ready for college work. Fewer than 300,000 are majoring in STEM fields and only about 167,000 are expected to be STEM college graduates by 2011.



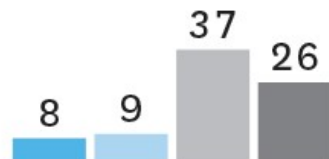
Source: NCES Digest of Education Statistics; Science & Engineering Indicators 2008

## PERCENT OF U.S. WOMEN IN STEM WHO REPORT...

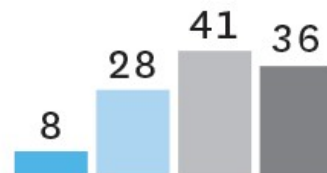
having to provide more evidence of competence than others to prove themselves.



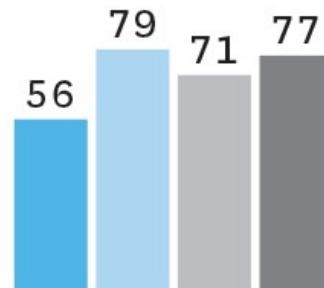
that colleagues have suggested they should work fewer hours after having children.



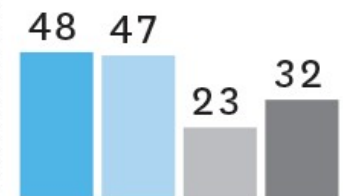
that at work, they find themselves pressured to play a stereotypically feminine role.\*



that women in their work environments support one another.



they've been mistaken for either administrative or custodial staff.



\*SUCH AS "OFFICE MOTHER" OR "DUTIFUL DAUGHTER."

SOURCE JOAN C. WILLIAMS, KATHERINE W. PHILLIPS, AND ERIKA V. HALL

HBR.ORG

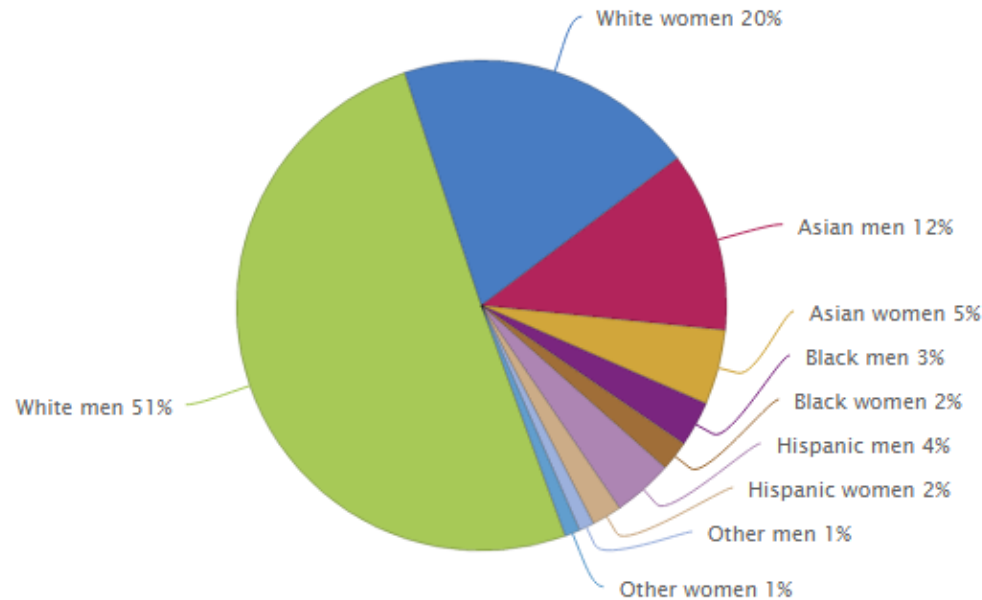
**Who are our students and how can we best help them thrive?**



# Underrepresentation in STEM

## Scientists and engineers working in science and engineering occupations: 2013

View: Chart | [Table](#)



NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.

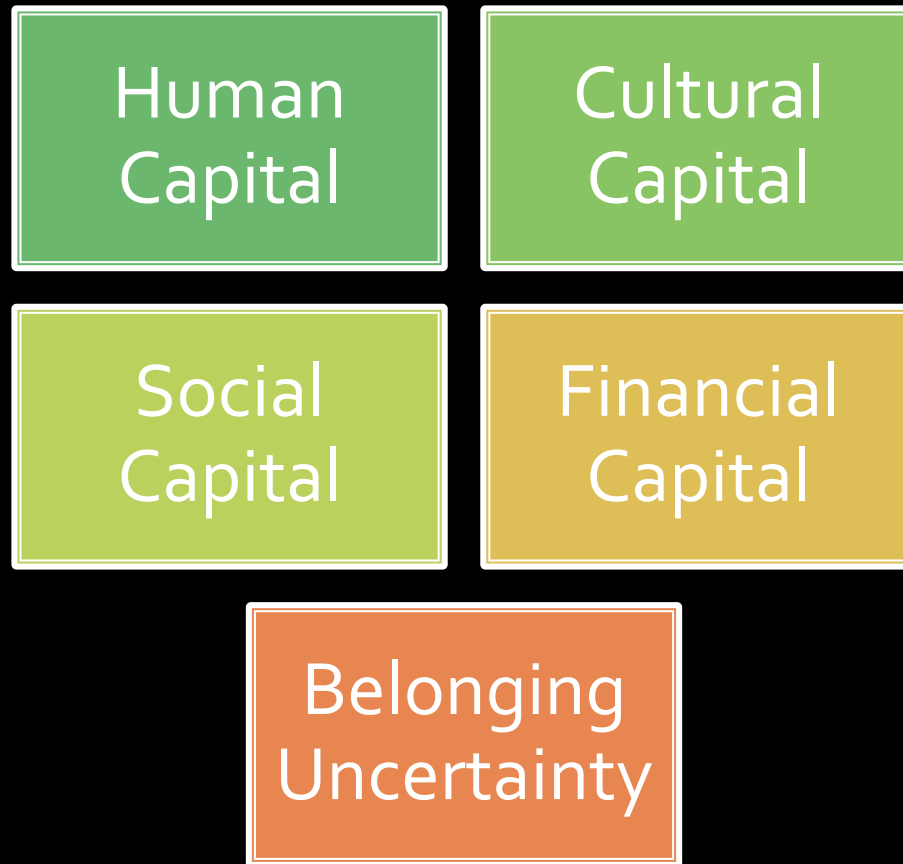
Women in  
STEM fields:  
the numbers

<https://www.nsf.gov/statistics/2015/nsf15311/digest/theme2.cfm#economics>

# LIFG Students in STEM

- The “Invisible” minority
- RRCC is rapidly becoming a predominantly LIFG institution
- Students sense of belonging is often impeded\*

# Student Barriers to Success - URM/LIFG



Keys to student engagement

# Identity and performance

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# Stereotype threat

Landmark study by Steele and Spencer (Univ of Michigan):

- Strong women and men math students were recruited
- One group was given a math test and told that it showed gender differences in the scores
- The second group was given the math test and told that it showed no gender differences in the scores

# Stereotype threats - Results

- When told the test showed gender differences, **women performed worse than equally skilled men**
- When told the test showed no gender difference, the women performed at the same high level as the equally skilled men, ***the underperformance disappeared***

# Stereotype threat

- Women and minorities underperformed when they were under the identity contingency of stereotype threat, but not when that contingency was removed.
- The impact their identities had on them changed dramatically from one situation to the next

# Imposter syndrome

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- When are they going to find out that I don't belong?



# Imposter Syndrome

## The Imposter Phenomenon in High Achieving Women: Dynamics and Therapeutic Intervention

Pauline Rose Clance & Suzanne Imes

*Georgia State University  
University Plaza  
Atlanta, Georgia 30303*

**Abstract:** *The term impostor phenomenon is used to designate an internal experience of intellectual phonies, which appears to be particularly prevalent and intense among a select sample of high achieving women. Certain early family dynamics and later introjection of societal sex-role stereotyping appear to contribute significantly to the development of the impostor phenomenon. Despite outstanding academic and professional accomplishments, women who experience the imposter phenomenon persists in believing that they are really not bright and have fooled anyone who thinks otherwise. Numerous achievements, which one might expect to provide ample object evidence of superior intellectual functioning, do not appear to affect the impostor belief. Four factors, which contribute to the maintenance of impostor feelings over time, are explored. Therapeutic approaches found to be effective in helping women change the impostor self-concept are described.*

1978 publication introduced the idea of imposter syndrome, after studying high-achieving women

# Imposter syndrome

Helping students see there is value in being at the beginning of your path:

- Recognize the benefits of being a novice in your field.
- Provide a fresh view on a problem.
- Focus more on what you're learning than on how you're performing.

# Implicit Bias



We have a **bias** when, rather than being neutral, we have a preference for (or aversion to) a person or group of people. Thus, we use the term “**implicit bias**” to describe when we have attitudes towards people or associate stereotypes with them without our conscious knowledge.

# Test for Implicit Bias

A set of tools to help individuals assess their cultural blind spots are the tests is run by [Project Implicit](#). The Implicit Associate Tests (IATs) aim to investigate thoughts and feelings that exist **outside of conscious awareness or conscious control**. These implicit biases do not necessarily constitute prejudice, but they can be predictive of behavior in the absence of conscious efforts to be egalitarian.

On the website there are tests probing biases on a number of different axes, including:

- Skin Tone: Assesses unconscious bias regarding lighter vs darker skin tone
- Gender - Science: Assesses unconscious bias regarding women in the sciences vs the liberal arts
- Gender - Career: Assesses unconscious bias regarding traditional gender roles
- Race: Assesses unconscious preferences regarding blacks and whites
- Sexuality (Gay-Straight): Assesses unconscious bias regarding homosexual vs heterosexual

# Resources:

- Whistling Vivaldi: how stereotypes affect us and what we can do by Claude M. Steele
- Blind Spot: Hidden Biases of Good People by Anthony Greenwald and Mahzarin Banaji



Keys to student engagement

# Identity and context

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# Activity 1: LC/MC One Page Worksheet

Complete the characteristics table on two levels:

## 1. The Individual Level:

- Quickly chose between the two parallel statements in each column that best characterizes you as you work or study within the context of the most familiar educational setting (e.g., department, college, campus, etc) but not at home or other non-academic communities.
- Circle the letter “M” (for “me”) on either the right or left comment. If you feel you are “both” or “can’t decide,” mark the “M” in the middle between the comments.

## CONTEXTURAL RELATIONSHIP WORKSHEET – R. IBARRA

(LC)		(HC)
<p>M <b>Low use of nonverbal signals</b></p> <p>○ Less attuned to body language to communicate</p>	M	<p>M <b>High use of nonverbal signals</b> such as and <span style="border: 1px solid red; border-radius: 50%; padding: 2px;">M</span></p> <p>○ body language through voice, expression and gestures ○</p>
<p>M <b>Communication is direct</b></p> <p>○ Get to the main point quickly, spell things out exactly. May appear to be blunt, or even rude</p>	M	<p>M <b>Communication is indirect</b> M</p> <p>○ Avoid getting to the main point quickly. ○</p> <p>People get main ideas from context</p>
<p>M <b>Sparse Interpersonal feedback</b></p> <p>○ Avoid interfering with others' lives. Mood shifts attributed to personal problems often to be ignored.</p>	M	<p>M <b>Frequent interpersonal feedback.</b> M</p> <p>○ Constant checking on emotional status is important for group morale. ○</p> <p>Attuned to slight mood changes among friends and colleagues.</p>
<p>M <b>Disagreement is depersonalized.</b></p> <p>○ Tend to withdraw from conflict and get on with task. Can defuse confrontation by quiet separation.</p>	M	<p>M <b>Disagreement is personalized.</b> M</p> <p>○ Sensitive to conflict and criticism. ○</p> <p>Defuse confrontation and unpleasantness</p> <p>Resolve conflict before work can progress.</p>
<p>M <b>Personal commitment to people is low.</b></p> <p>○ Relationships start and end quickly.</p>	M	<p>M <b>Personal commitment to people is high.</b> M</p> <p>○ Relationships depend on trust and build slowly. ○</p>
<p>M <b>Task orientation.</b></p> <p>○ Things get done when everyone follows policies and procedures and pays attention to goals. People are not as important as completing the job.</p>	M	<p>M <b>Process orientation.</b> M</p> <p>○ Getting things done depends on relationships and attention to group process. Courtesy and kindness are more important than completing a job. ○</p>
<p>M <b>Time is a commodity</b> to be spent, saved, carved</p> <p>○ out, lost and made up. Emphasis on promptness, speed, schedules, and efficiency. Time is money. Change happens fast.</p>	M	<p>M <b>Time is process</b> and part of nature; it belongs to M</p> <p>○ everyone. ○</p> <p>Emphasis on people and completion of transactions. Change happens slowly because things are rooted in the past.</p> <p>Deadlines are goals to be achieved if possible.</p>



# Activity 2: LC/MC One Page Worksheet

Complete the characteristics table on two levels:

## 1. The Institutional Level:

- Now, do the same but select the most appropriate statement or characteristic that best describes the institution in that same educational setting.
- Circle the letter “O” (for “organization”) on either the right or left comment. If you feel you are “both” or “can’t decide,” mark the “M” in the middle between the comments.

## CONTEXTURAL RELATIONSHIP WORKSHEET – R. IBARRA

(LC)		(HC)	
M	<b>Low use of nonverbal signals</b>	M	<b>High use of nonverbal signals</b> such as and
<input checked="" type="radio"/>	Less attuned to body language to communicate	O	body language through voice, expression and gestures
M	<b>Communication is direct</b>	M	<b>Communication is indirect</b>
O	Get to the main point quickly, spell things out exactly. May appear to be blunt, or even rude	O	Avoid getting to the main point quickly. People get main ideas from context
M	<b>Sparse Interpersonal feedback</b>	M	<b>Frequent interpersonal feedback.</b>
O	Avoid interfering with others' lives. Mood shifts attributed to personal problems often to be ignored.	O	Constant checking on emotional status is important for group morale. Attuned to slight mood changes among friends and colleagues.
M	<b>Disagreement is depersonalized.</b>	M	<b>Disagreement is personalized.</b>
O	Tend to withdraw from conflict and get on with task. Can defuse confrontation by quiet separation.	O	Sensitive to conflict and criticism. Defuse confrontation and unpleasantness Resolve conflict before work can progress.
M	<b>Personal commitment to people is low.</b>	M	<b>Personal commitment to people is high.</b>
O	Relationships start and end quickly.	O	Relationships depend on trust and build slowly.
M	<b>Task orientation.</b>	M	<b>Process orientation.</b>
O	Things get done when everyone follows policies and procedures and pays attention to goals. People are not as important as completing the job.	O	Getting things done depends on relationships and attention to group process. Courtesy and kindness are more important than completing a job.
M	<b>Time is a commodity</b> to be spent, saved, carved	M	<b>Time is process</b> and part of nature; it belongs to
O	out, lost and made up. Emphasis on promptness, speed, schedules, and efficiency. Time is money. Change happens fast.	O	everyone. Emphasis on people and completion of transactions. Change happens slowly because things are rooted in the past. Deadlines are goals to be achieved if possible.

# The Emerging Multicontext World

## Definition of “Cultural Context”:

- Hall defined it as inter-cultural communication based on observations of interpersonal transactions across a wide variety of cultural interfaces. That transaction takes account of *how information is handled and how cultural messages are transmitted*.
- Cultural context translates *behavior into meaning* – why do people do what they do and how that affects everything around us both consciously and unconsciously.

# LOW CONTEXT



## Interaction

- Emphasis on words to supply meaning & low use of non-verbal signals
- Communication is direct
- Disagreement is depersonalized

# HIGH CONTEXT



## Interaction

- High use of non-verbal signals with words to contextualize meaning.
- Communication is indirect
- Disagreement is personalized

LC	Learning	HC
Knowledge is obtained by logical reasoning – step-by-step scientific analysis yields information	5 4 3 2 1 0 1 2 3 4 5	Knowledge is obtained by gestalt – facts are complete and embedded in the context of situations
Reality is elemental and can be isolated or compartmentalized for analysis	5 4 3 2 1 0 1 2 3 4 50	Reality can not be easily separated for analysis because things are inter-connected
Analytical thinking is important - prefer inductive reasoning (from specific to general) – focus on compiling details	5 4 3 2 1 0 1 2 3 4 5	Comprehensive thinking is important - prefer deductive reasoning (from general to specific) – focus on “big picture”
Learn best by following directions	5 4 3 2 1 0 1 2 3 4 5	Learn best by demonstration
Learning is oriented toward the individual – prefer to work apart from others – teamwork means everyone does their specific task	5 4 3 2 1 0 1 2 3 4 5	Learning is group oriented – prefer to work in groups to learn – teamwork means interacting
Creative learning process is externalized – use pens, paper, computers, books etc - process is visible for others to evaluate	5 4 3 2 1 0 1 2 3 4 5	Creative learning process is internalized – use head instead of extensions such as pens & paper; process is less visible for others to evaluate
<b>Learning Average</b>	5 4 3 2 1 0 1 2 3 4 5	
	LC MC HC	

# Example: Lab Activities

LC

HC

Individuated

Integrated

Traditional science lab

- Follow a procedure
- Get a result
- Analyze result

Inquiry based lab

- No set procedure
- Student discovers
- Develops context

*This is why we need a variety of learning strategies*

# Brainstorm: Identify an LC and HC aspect of one of your classes

- LC

- HC

# Strategies

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**Reframe**

**Emphasis on relevance**

**Attract**

**Create community**

**Thrive**

**Raise expectations for success**



# InTeGrate

- <http://serc.carleton.edu/integrate/in>



# Activity focus

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- Short lecture sections to connect content
- Weave in activities/group work
- Group problem solving
- Invite discussion
- Mix it up!

# Research in the Classroom

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- Think about data oriented research projects
- Lots of free data available
- Interdisciplinary projects

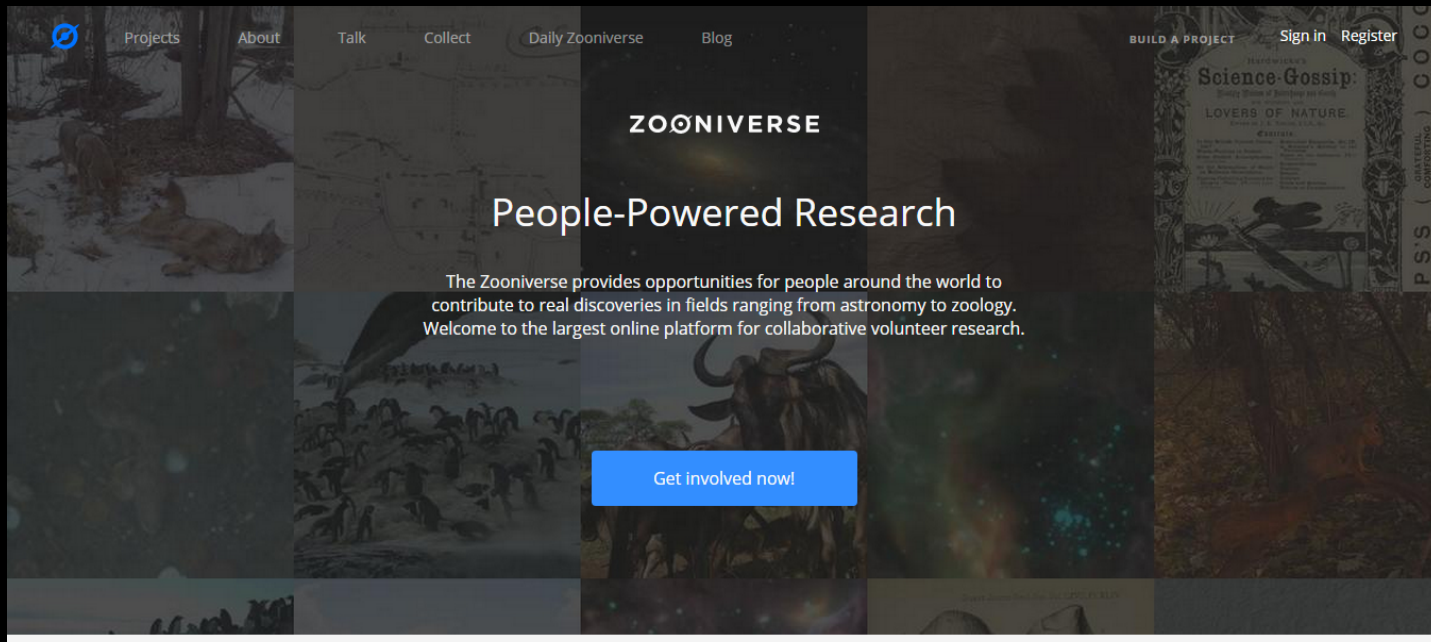
# Access to Data

Lots of free, federal information:

- [www.data.gov](http://www.data.gov)
- Examples:
  - <http://coastwatch.pfel.noaa.gov/erddap/index.html>
  - <http://www.ncdc.noaa.gov/>
  - <http://opendata.cern.ch/?ln=en>
  - <https://data.nasa.gov/>
  - [http://serc.carleton.edu/sp/library/google\\_earth/activities.html](http://serc.carleton.edu/sp/library/google_earth/activities.html)

# Citizen science projects

- <https://www.zooniverse.org/#/>



# Activity 3: Survey and Action Plan

- <https://goo.gl/forms/vqu7FiHVARs8NxZg1>
- If you did not fill out this survey after part 1 of the training, please fill it out now.

# Papers & other resources

- **Imposter Syndrome**

[https://www.researchgate.net/publication/270879652\\_Fear\\_of\\_Being\\_Exposed\\_The\\_Trait-Relatedness\\_of\\_the\\_Impostor\\_Phenomenon\\_and\\_its\\_Relevance\\_in\\_the\\_Work\\_Context](https://www.researchgate.net/publication/270879652_Fear_of_Being_Exposed_The_Trait-Relatedness_of_the_Impostor_Phenomenon_and_its_Relevance_in_the_Work_Context)

- **Imposter Syndrome TedTalk**

[https://www.ted.com/talks/dena\\_simmons\\_how\\_students\\_of\\_color\\_confront\\_impostor\\_syndrome](https://www.ted.com/talks/dena_simmons_how_students_of_color_confront_impostor_syndrome)

- **References** <http://impostersyndrome.com.au/index.php/the-research/>

- **Evidence on Promising Practices in Undergraduate STEM**

[http://sites.nationalacademies.org/DBASSE/BOSE/DBASSE\\_o8o1o6](http://sites.nationalacademies.org/DBASSE/BOSE/DBASSE_o8o1o6)

- **Cultural Competence in the College Biology Classroom**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2104499/>