

# EPSCoR WRIT LARGE

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# EPSCoR Benefits

- Builds infrastructure and capacity that enhances research potential of world class faculty and students
- Advances research innovation to solve local and national problems
- Trains the scientific workforce of tomorrow
- Broadens participation of underrepresented groups in science and the science workforce
- Supports job creation, local industry, and economic development



# EPSCoR FY13 Track-1 Outputs\*

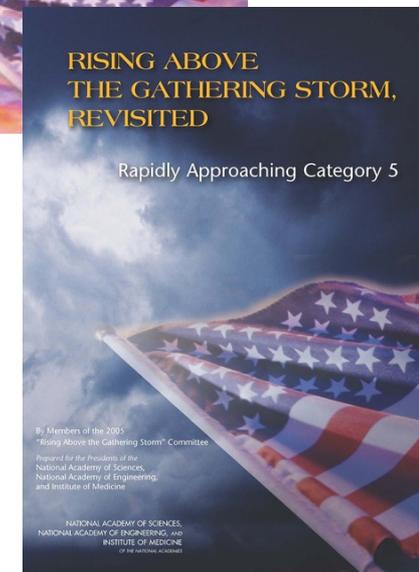
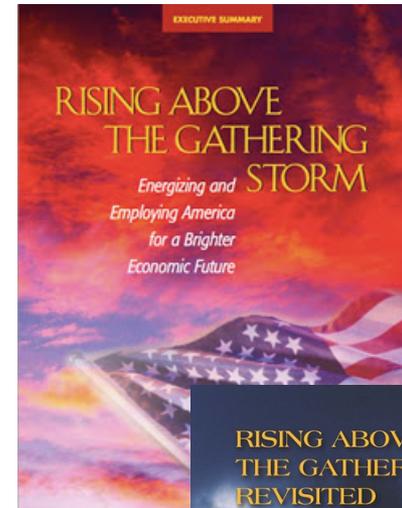
- Proposals
  - 1,964 submitted, totaling \$1,288.2M
  - 654 awarded, totaling \$259.5M
- Patents
  - 12 Awarded
  - 55 pending
- Publications
  - 679 Primary Track-1 support
  - 1,254 Partial Track-1 support
- K-12 Outreach
  - 3,829 teachers trained (14% URM)
  - 51,102 Students reached directly (34% URM)
  - 111,666 Students reached through teacher training (19% URM)



\* Includes all jurisdictions with active RII Track-1 projects; excludes GU, MO & PR

# EPSCoR

- Draws on all the talents of the U.S.
  - Aging workforce
  - US lagging in global S&E
  - S&T enterprises desperately need well-trained professionals



# EPSCoR States are Key to US S&E Success

- Home to 57 of Fortune 500 companies
- Contain 22% of high-tech business
- 9 of the 10 states that produce more energy than they consume are EPSCoR states
- Account for 22% of employed US workforce
- Produce 21% of higher education S&E degrees and 16% of S&E Ph.Ds.
- Home to 69% of MSIs and 50% of HBCUs
- Receive about 10% of federal research funding

.....but are Underutilized



IOWA EPSCoR

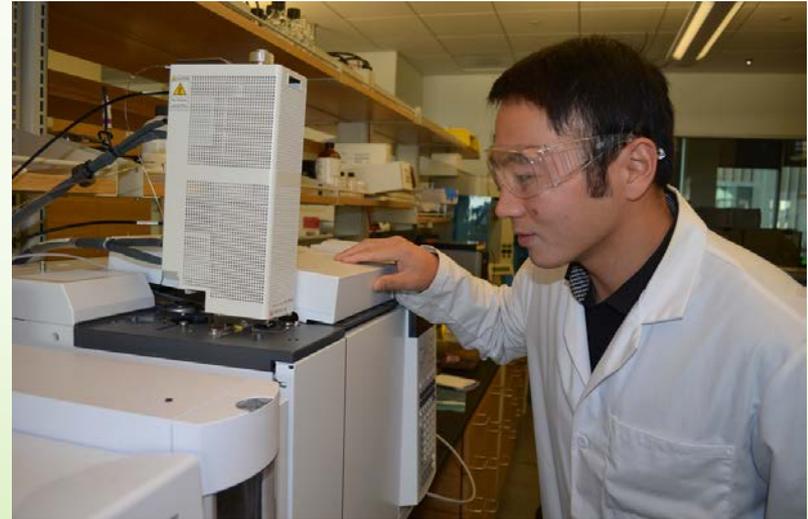
# Biomass to Bio-oil

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EPSCoR builds infrastructure and capacity that enhances research potential of world class faculty and students

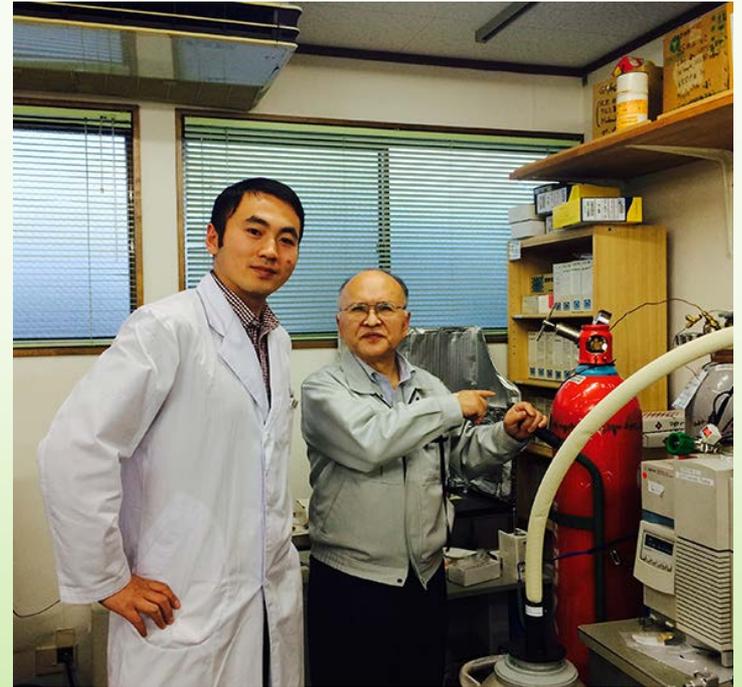
# Building Infrastructure & Expertise

- PhD student worked with unique new micro pyrolysis instrument purchased through Iowa NSF EPSCoR
- System used to research new methods of turning biomass into fuels and chemicals



# International & Industry Partnerships

- System was first to combine pyrolysis and catalysis
- Student went to Japan to work with instrument manufacturer to build a high-pressure version
- Led to new patent, further research





# Covert Quick Response Codes

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EPSCoR advances research innovation to solve local and national problems

# Research Innovation for National Security

- SD EPSCoR uses unique nano-particles to make ink to print covert Quick Response (QR) Codes.
- Included in the QR codes are printed patterns not visible to naked eye but glows intense green with laser.
- Covert QR codes read with a smartphone to recover secret, embedded information
- Can be used to prevent counterfeiting of products, e.g. currency, pharmaceuticals
- Potential to save government and industry billions of dollars annually





# Recipe for Workforce Development

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EPSCoR trains the scientific workforce of tomorrow

## Building Tomorrow's STEM Workforce by Connecting Research and Education through Partnerships

### Recipe

#### **Prepare:**

- ✓ Seven Maine EPSCoR Track 1 Sustainability Solutions Initiative (SSI) researchers receive communications coaching on presenting to high school students about a research problem that they have.

#### **Add:**

- ✓ 387 low income, first generation high school students in a 5-week summer Upward Bound Math Science partner program.
- ✓ A partnership with UMaine's Foster Center for Student Innovation to train the students in innovation engineering techniques and work with them throughout the program.

#### **Let simmer:**

- ✓ A team of students generate ideas for how to help SSI researchers in the Vernal Pools project catch salamanders.



## Building Tomorrow's STEM Workforce by Connecting Research and Education through Partnerships

### Recipe

**Cook:**

- ✓ Students develop a prototype portable trap that is inexpensive and will not injure salamanders.

**Stir in:**

- ✓ 27 UMaine student volunteers from the Wildlife Society build the new traps for SSI researcher use.

**Results:**

- ✓ SSI researchers deploy the traps, catching 50x as many specimens as expected, which will help expand their ability to inform policy development around urbanization and vernal pools.
- ✓ Potential for commercialization of new student-designed traps.
- ✓ Win-win-win situation - for students, for researchers, and for Maine!





# Nurturing American Tribal Undergraduate Research and Education (NATURE)

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EPSCoR broadens participation of underrepresented groups in science and the science workforce



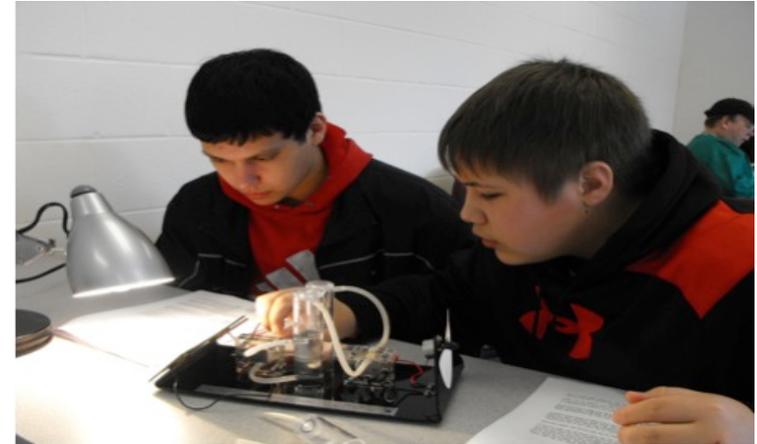
# North Dakota EPSCoR

## *Broadening Participation*

*Nurturing American Tribal Undergraduate Research and Education  
(NATURE)*



- **NATURE** – an educational outreach program that builds pathways for Native American students in North Dakota to pursue STEM careers
- **Five Tribal College Partners:** Cankdeska Cikana Community College, Fort Berthold CC, Sitting Bull College, Turtle Mountain CC, and United Tribes Technical College
- Program includes **Sunday Academies** for high school students, **Tribal College Summer Camps** and **University Research Summer Camps** for Tribal College Students, Faculty, and High School teachers.





# North Dakota EPSCoR

## *Broadening Participation*

*Nurturing American Tribal Undergraduate Research and Education  
(NATURE)*



- More than 240 North Dakota Native American students participate in **NATURE** programs annually
- A **NATURE** participant received an **NSF Graduate Research Fellowship**. The student is currently enrolled in the Zoology Ph.D. program at NDSU.





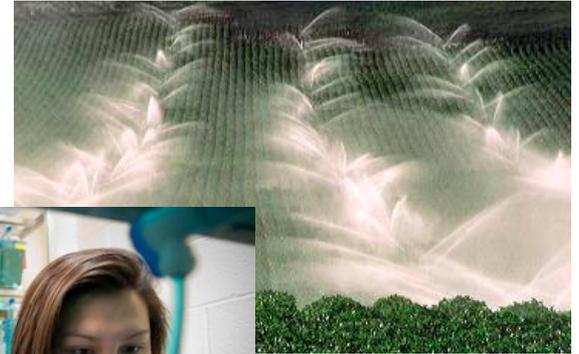
# Boosting Trout Economics

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EPSCoR supports job creation, local industry, and economic development

# Idaho: Natural Resource Based Economy

- 2<sup>nd</sup> largest diverter of water for agriculture in the US
- Diverts more water for aquaculture than rest of US combined
- 420,000 anglers annually
- Home to 19 fish species that are endangered or threatened



# Threat to Trout Industry

- Aquaculture effluents stimulate unwanted algal and aquatic plant growth
- State regulations now restrict effluents from fish culture facilities
- Regulations threatened to curtail production by trout industry



# EPSCoR funds Fish Culture Experiment Station

- Fundamental research
- Employs ~40 people
- Hosts visiting scholars from around the world
- High-profile international reputation in academia & industry
- Significant engagement of researchers & students from the Columbia Basin Inter-Tribal Fish Commission and partnerships with many tribes



## ...and Solves the Problem

- Selective trout breeding program using plant-based diet rather than traditional, more expensive fishmeal diet
- Fish now reach harvest size in half the time and perform better on plant based diet
- Results have increased profitability of trout industry and its long-term sustainability
- Higher trout production worth > \$6M/year Idaho alone





- Builds research capacity
- Enables research innovation – solves national problems
- Trains scientific workforce
- Broadens participation – draws on all US talents
- Supports economic development

Thank You!

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