# Recruiting and Working With Graduate Students

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On the Cutting Edge
Professional Development for Geoscience Faculty

NAGT

# Share your experience

- What have you done?
- What have been your results?

# Step 1: Recruitment

- **Be proactive!!**
- But what does this mean?
  - A few examples follow
- Commit Time to Recruitment
  - You are picking a team that will have HUGE impact on your research success
  - Will your students be tenure makers or tenure breakers?

# Recruitment Tables at a Conference

- **Reality** – these are not the best places to recruit students – but they are great for name recognition (your university and your department)
  - Better to spend $$ elsewhere
  - Example…..
- If you still want to do this and cost is an issue for your department, see if another unit in your university will cost share (Grad School, Provost, VP for Research)

# Advertise!

- Pay for an advertisement in EOS/GSA Today
  - Research or teaching positions
  - Advertise scholarship funds
  - Cost sharing (again)
  - Maybe you can use startup funds?

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## Crowdsourcing Power Plant Carbon Dioxide Emissions Data

Information on greenhouse gas emissions from the world's power plants is surprisingly limited. Publicly available information such as exact location, fuel, and carbon dioxide ($CO_2$) emissions varies in comprehensiveness and quality from country to country. A research group at Arizona State University (ASU) is attempting to solve this problem by leveraging crowdsourcing.

The ASU group is inviting global citizens to contribute information on power plant locations, their energy outputs, and estimates of their $CO_2$ emissions through a website called Ventus (http://ventus.project.asu.edu/). The project will use this information to better quantify and understand the global carbon cycle. Given that feedbacks between the carbon cycle and climate change remain a key ingredient in reliably projecting climate change, this information will improve scientists' ability to estimate future greenhouse emissions.

*The Need for Fine-Scaled Global Emissions Data*

Emissions quantification and geolocation of power plants emitting fossil fuel $CO_2$ is a critical component in carbon budget studies, atmospheric $CO_2$ monitoring, and research that tracks carbon through the oceans, biosphere, and atmosphere. Power plants are the largest emitting sector globally, although their individual footprints occupy a very small portion of the land surface. The correct quantification and location of power plant $CO_2$ emissions is critical information and must be part of current attempts aimed at characterizing spatially explicit global fossil fuel $CO_2$ emissions.

In studies that attempt to understand the complete global carbon cycle (ocean exchange, biological exchange, and human emissions), the fossil fuel $CO_2$ portion of the carbon budget is often included as a "known" with little to no uncertainty. Hence, errors in either the location or the amount of emissions will cause direct bias in other portions of carbon cycle estimations, limiting scientists' ability to understand how the ocean and terrestrial biosphere interact with climate. As the density of surface $CO_2$ observations increases and more $CO_2$ observations are made from remote sensing platforms, the scale at which accurate

*Crowdsourcing* cont. on page 386




*Fig. 1. Screenshot of a portion of the entry page for the addition of a power plant marker in the Ventus system. The aerial photograph in the screenshot is from Google Earth™.*

## Real-Time GPS Network Monitors Bayou Corne Sinkhole Event

In August 2012 a sinkhole developed in the swampy marshland near the rural community of Bayou Corne in Assumption Parish (i.e., county), Louisiana. The area was evacuated, and some residents have still not been able to return. The sinkhole—which now measures about 450 meters wide and is continuing to grow—is being monitored by multiple systems, including four rapid-response GPS continuously operating reference stations (CORS) called CORS911. The real-time data provided by this system are used by scientists and decision makers to help ensure public safety.

*The Bayou Corne Sinkhole and the Napoleonville Salt Dome*

The sinkhole formed within the Mississippi River alluvial plain situated directly above the western wall of the Napoleonville salt dome [*Miller Engineering and Associates, Inc.*, 2013]. Models developed by response agencies suggest that a solution-mined brine cavern located about 1.7 kilometers beneath the surface breached the salt dome wall [Louisiana *Department of Natural Resources* (*LADNR*), 2013a], which triggered instability within a column of sedimentary rock running vertically along the edge of the structure. The subsequent microearthquakes, long-period seismic events, and surficial subsidence continue to affect the area [*LADNR*, 2013b].

These hazards are particularly acute for the portion of Louisiana Highway 70 located approximately 200 meters north of the containment berm surrounding the sinkhole (Figure 1). Highway 70 is a designated hurricane evacuation route for the region and an essential corridor for local and regional commerce. The stretch of highway most vulnerable to the sinkhole extends between Bayou Corne in the west and Bayou Choupique in the east. Between them lies the community of Bayou Corne (population 280) and a handful of businesses [*U.S. Census Bureau*, 2010]. The area is a popular destination for recreational fishing and hunting and supports multiple oil- and gas-processing facilities. Within the region, the salt diapir supports numerous injection wells [*LADNR*, 2013c], which are typically leased for solution mining and storage of refined hydrocarbons.

*GPS for Hazard Monitoring*

Response activities following natural and anthropogenic disasters, including hurricanes [*Rayen et al.*, 2006], earthquakes [*Zook et al.*, 2010], and industrial spills [*Kent and Dokka*, 2011], demonstrate how GPS technologies are integral for contemporary emergency management practices. When coupled with robust decision support frameworks, the location-based capabilities provided by GPS can augment existing response and recovery efforts [*Cutter*, 2003].

Whether measuring deformations along fault zones [*Bock et al.*, 1997] or surveying flood protection levees [*Blum et al.*, 2009], GPS and other global navigation systems improve situational awareness by providing a synoptic understanding of hazards and their risks. Accordingly, efforts are under way to exploit these capabilities using a system of rapid-response GPS reference stations capable of continuous real-time hazard monitoring in response to disasters. Such a system, CORS911, is currently operating for the Bayou Corne sinkhole event in Louisiana.

*CORS911: Continuous GPS for Emergency Response*

The Louisiana Department of Transportation and Development (LADOTD) funded the CORS911 project to provide real-time subsidence monitoring along the portion of highway most vulnerable to the sinkhole. Initiated in April 2013, this multiyear project, led by researchers at Louisiana State University, provides continuous observations using four GPS reference stations installed at select locations along the corridor.

Configured with a Trimble NetR8 receiver and geodetic antenna, each sentinel

***Bayou Corne Sinkhole*** cont. on page 386



*Fig. 1. Bayou Corne sinkhole study area depicting Louisiana Highway 70 and the CORS911 sentinels. Contour lines depict the sinkhole and subsurface structure of the salt dome estimated for 2010. CORS, continuously operating reference station; LADOTD, Louisiana Department of Transportation and Development.*

# Leverage University Resources

- Purchase names of targeted groups from ETS (GRE/ TOEFL)
- Make sure that you contact potential applicants who have submitted GRE scores, but not applied
- Make sure you are part of “campaigns”
- Use common lists of high achieving students
  - McNair
  - Council on Undergraduate Research
- Gather university recruitment materials
- Become familiar with benefits/support programs for students at your university
  - Use these as selling points – i.e. do you have lactation rooms, health insurance, mentoring programs, etc.

# University Recruitment

- Find out which universities your university recruits at!
  - Identify key universities and offer to come along
  - Offer to use your contacts (domestic or international) and travel to recruit at these places – very often your university will financially support this – ASK!

# University /Departmental Open Houses

- Be an active participant in on campus university recruitment events
- If you don't have one, propose (but don't run as an assistant professor) a departmental open house
  - There are almost certainly groups on campus who will help with this

# Campus Visits

- Have prospective students visit
  - Find financial resources to support this (departmental/university, cost share)
- Leverage campus resources
  - Do you have organized tours?
  - Can a dean from your college/grad school meet with the student?
  - Do you have student ambassadors who can meet/eat with the prospective student?
  - Are there resources for housing (examples of some you may not have though of....)?

# The Little Things

- Respond to student enquiries in a timely fashion (would you work for someone who takes 9 days to reply to an email?)
- Make sure that your research is featured on your university web page and in university publications (i.e. research magazine, alumni magazine)
- Take other opportunities (e.g. Professor Podcasts)
- Call/Skype/FaceTime with prospects – your "competition" is almost certainly not doing this

# The Little Things

- Have your chair/dean call the applicant
- Have other faculty call the applicant

# Step 2: Closing The Deal

- So, you have managed to get the best student ever to apply – this is where the hard part of recruitment starts!
- This is where a campus visit may be VITAL
- Be familiar with what your university offers that others do not….. examples….
- Be responsive
- Have studenst contact the applicant
- Have chair/dean contact student
- Does the applicant have housing/town resources?

# Money

- Sometimes it all comes down to money…..
  - Are there institutional fellowships that you can nominate your applicant for (even at the last moment)?
  - Are there departmental scholarships?
  - If you are offering a GTA position, can you supplement it with any of the above?
  - If you have support from a 3 year grant for the student, will the university "match" this with a 4$^{th}$ year? Ask!

# Step 3: Keeping that Excellent Student and Working with Them

- Make sure that class/research expectations are clear
  - Informal contracts?
- Scope of M.S. vs. Ph.D. projects
- Most students are not "Type-A" over achievers like you….
- What are your student's goals? Take this into consideration!
- Will they stay for the summer?

# Keeping that Excellent Student and Working with Them

- Keep an eye out for opportunities for that student – professional (e.g. writing workshops) and financial (e.g. scholarships)
- Make sure that they have research/conference travel money
  - Do you know about all the resources your university offers?
- Weekly meetings (individual/group)
- Make sure your chair/dean knows all the good things that you/they do – sell yourself and your students!

# Watch them Graduate!

- Go to commencement!
- Questions/Comments?